VPDES PERMIT PROGRAM FACT SHEET
FILE NO: VA0005215@ECM

This document gives pertinent information concerning the VPDES Permit listed below. This permit is being processed as a MAJOR, INDUSTRIAL permit.

1. PERMIT NUMBER: VA0005215 EXPIRATION DATE: June 29, 2015

2. FACILITY NAME / MAILING ADDRESS:

U.S. Navy Norfolk Naval Shipyard
Code 106, Building M-22
Portsmouth, Virginia 23709

FACILITY LOCATION ADDRESS (IF DIFFERENT)

2600-2700 Effingham Boulevard
Portsmouth, Virginia 23709

CONTACT AT FACILITY:
NAME: Mr. Michael Johnson
TITLE: Clean Water Program Mngr.
PHONE: (757) 396-5728
EMAIL: michael.d.johnson20@navy.mil

ALTERNATE CONTACT AT LOCATION ADDRESS:
NAME: Ms. Cara Hanson
EMAIL: cara.hanson@navy.mil

3. OWNER CONTACT: (TO RECEIVE PERMIT)
NAME: Mr. J.G. Alspaugh
TITLE: Director of Occupational Safety, Health & Environment Office

23606

COMPANY NAME: (IF DIFFERENT)
ADDRESS: Same as Paragraph 2.
PHONE: (757) 396-7231
EMAIL: not provided

CONSULTANT CONTACT:
NAME: AH Environmental Consultants, Incorporated
ADDRESS: 11837 Rock Landing Drive
Suite 300
Newport News, Virginia

PHONE: (757) 873-4959
EMAIL: smcnamara@ahenv.com

4. PERMIT DRAFTED BY: DEQ, Water Permits, Tidewater Regional Office

Permit Writer(s): C. Thomas Date(s): May - July 2015
Reviewed By: D. Austin Date(s):

5. PERMIT TRANSACTION:

( ) Issuance **(X) Reissuance** ( ) Revoke & Reissue ( ) Owner Modification
( ) Board Modification ( ) Change of Ownership/Name [Eff. Date: N/A]

6. SUMMARY OF SPECIFIC ATTACHMENTS, LABELED AS:

Attachment	1	Site Inspection Report/Memorandum
Attachment	2	Discharge Location/Topographic Map
Attachment	3	Schematic/Plans & Specs/Site Map/Water Balance
Attachment	4	TABLE I - Discharge/Outfall Description
Attachment	5	TABLE II - Effluent Monitoring/Limitations
Attachment	6	Effluent Limitations/Monitoring Rationale/Suitable Data/ Antidegradation/Antibacksliding
Attachment	7	Special Conditions Rationale
Attachment	8	Toxics Monitoring/Toxics Reduction/WET Limit Rationale
Attachment	9	Material Stored
Attachment	10	Receiving Waters Info./Tier Determination/STORET Data/ Stream Modeling and 303(d) Listed Segments
Attachment	11	TABLE III(a) and TABLE III(b) - Change Sheets
Attachment	12	NPDES Industrial Permit Rating Worksheet
Attachment	13	Chronology Sheet
Attachment		Public Participation

APPLICATION COMPLETE: February 9, 2015 (upon receipt of additional SW data)

ATTACHMENT 7

SPECIAL CONDITIONS RATIONALE

ATTACHMENT 7
VPDES Permit Program
List of Special Conditions & Rationale

Name of Condition:

B. WET Schedule and Limitation

Rationale: Required by the State Water Control Law, Section 62.1-44.15 (3a) and the State's Water Quality Standards (9 VAC 25-260-20). In addition, the VPDES Permit Regulation, 9 VAC 25-31-220 D. and 40 CFR 122.44 (d) require limits necessary to meet water quality standards. In accordance with the VPDES Permit Regulation, 9 VAC 25-31-250, and 40 CFR 122.47, the permit may, when appropriate, specify a schedule of compliance leading to compliance with the Clean Water Act, laws and regulations. See Attachment 8 of this fact sheet for additional justification.

C. OTHER REQUIREMENTS OR SPECIAL CONDITIONS

1. Permit Reopeners

a. Water Quality Standards Reopener

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-220 D requires effluent limitations to be established which will contribute to the attainment or maintenance of water quality criteria.

b. Total Maximum Daily Load (TMDL) Reopener

Rationale: For specified waters, Section 303(d) of the Clean Water Act requires the development of total maximum daily loads necessary to achieve the applicable water quality standards. The TMDL must take into account seasonal variations and a margin of safety. In addition, Section 62.1-44.19:7 of the State Water Control Law requires the development and implementation of plans to address impaired waters, including TMDLs. This condition allows for the permit to be either modified or, alternatively, revoked and reissued to incorporate the requirements of a TMDL once it is developed. In addition, the reopener recognizes that, in according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan or other wasteload allocation prepared under Section 303 of the Act.

2. Licensed Operator Requirement

Rationale: The Permit Regulation, 9 VAC 25-31-200 D and Code of Virginia 54.1 - Chapter 23 et. seq. (July 1, 2013), Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.) requires licensure of operators.

3. Operations & Maintenance (O & M) Manual

Rationale: The State Water Control Law, Section 62.1-44.21 allows requests for any information necessary to determine the effect of the discharge on State waters. Section 401 of the Clean Water Act requires the permittee to provide opportunity for the state to review the proposed operations of the facility. In addition, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) in order to achieve compliance with the permit (includes laboratory controls and QA/QC).

ATTACHMENT 7
VPDES Permit Program
List of Special Conditions & Rationale

Name of Condition:

C. OTHER REQUIREMENTS OR SPECIAL CONDITIONS (continued)

4. Notification Levels

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-200 and 40 CFR 122.42(a) require notification of the discharge of certain parameters at or above specific concentrations for existing manufacturing, commercial mining and silvicultural discharges.

5. Quantification Levels Under Part I.A.

Rationale: States are authorized to establish monitoring methods and procedures to compile and analyze data on water quality, as per 40 CFR part 130, Water Quality Planning and Management, subpart 130.4. Section b. of the special condition defines QL and is included per BPJ to clarify the difference between QL and MDL.

6. Compliance Reporting Under Part I.A.

Rationale: Defines reporting requirements for toxic parameters and some conventional parameters with quantification levels to ensure consistent, accurate reporting on submitted reports.

Additional Discussion: DEQ Guidance Memo Number 14-2011 (August 8, 2014) Nutrient Monitoring for "Nonsignificant" Discharges to the Chesapeake Bay Watershed, requires additional permit content at this point to ensure necessary and relevant information and data are reported for use by the DEQ under the Chesapeake Bay TMDL.

7. Materials Handling and Storage

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-50 A., prohibits the discharge of any wastes into State waters unless authorized by permit. The State Water Control Law, Sec. 62.1-44.18:2, authorizes the Board to prohibit any waste discharge which would threaten public health or safety, interfere with or be incompatible with treatment works or water use. Section 301 of the Clean Water Act prohibits the discharge of any pollutant unless it complies with specific sections of the Act.

8. Cooling Water and Boiler Additives

Rationale: Chemical additives may be toxic or otherwise violate the receiving stream water quality standards. Upon notification, the regional office can determine if this new additive will warrant a modification to the permit.

Additional Discussion: The applicant maintains several heating, ventilation and air conditioning (HVAC) systems that use potable water in their operations and discharge a chemically treated wastewater as part of regular maintenance activities. To date, the applicant has not sampled the final discharges from the active HVAC units with known point source discharges to storm water conveyances leading to surface waters. Based on a review of the application it was determined that monitoring be initiated as part of the reissued permit to characterize the discharges from on-site HVAC units. Monitoring and reporting will appear as a discrete special condition in lieu of appearing in Part I.A. of the permit. Reporting of resulting chemical and WET testing data will occur via Attachment A to the permit. In addition, an annual

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VPDES Permit Program
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Name of Condition:

C. OTHER REQUIREMENTS OR SPECIAL CONDITIONS (continued)

8. Cooling Water and Boiler Additives

report required by the current permit will be continued with the reissued permit to detail the operations of all HVAC units identified in previous CY annual reports. Information provided by the applicant will be compiled and reviewed during the next scheduled permit reissuance to determine if additional permit content or effluent limitations will be required at that time.

9. Locations of Representative Sampling Points for all Outfalls Under Part I.A. and Specific Sampling Methodologies for Selected Outfalls

Rationale: Defines methodology for collecting representative effluent samples in conformance with applicable regulations.

Additional Discussion: Due to the number and differing types of point source discharges at this expansive facility, including the commingled nature of many effluents, certain considerations must be specified in the permit to ensure that representative Part I.A. sampling and other required effluent screenings are performed during the term of the reissued permit. Some of the requirements under this condition are carried forward from the current permit as they remain relevant, appropriate, and applicable.

10. Enterococci Sampling and Analysis - Outfalls 100, 900, 400 and 500

Rationale: EPA Form 2C data submitted for outfalls 100, 400 and 500 appeared excessive upon review. When questioned as to the values reported, the applicant provided little information other than to note wildlife as a probable source. With permit reissuance, the applicant will be required to verify that assumption with monitoring for enterococci bacteria across the term of the reissued permit. Those data will be reviewed at the next reissuance to determine if numeric limitation or other operational controls will be required at that time.

11. Industrial Activities and Process Wastewater Discharges

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-190(H) requires the permittee to furnish information requested by the Agency to determine compliance with the permit; 9 VAC 25-31-220(I) allows for specific effluent sampling protocols to be defined and required by VPDES permits. The State Water Control Law, section 62.1-44.21, authorizes the Board to request information needed to determine the discharge's impact on State waters. In addition, the Board may require certain operational practices to maintain water quality through the VPDES permit, and to obtain certain information to determine compliance with the permit and/or to better understand process operations that may lead to water quality problems over the 5-year term of the reissued permit, or the need and necessity to add new or expand existing permit conditions and effluent limitations at subsequent permit reissuances.

Additional Discussion: This condition groups together several separate conditions addressing facility operations, process wastewaters, wastewaters commingled with storm water, and other conditions believed necessary to maintain water quality and compliance with the permit. Shipyard process wastewaters have been defined by the Department and this definition has been placed into VPDES permits issued to industrial activities operating under SIC codes 3731, 3732, and 4499.

ATTACHMENT 7
VPDES Permit Program
List of Special Conditions & Rationale

C. OTHER REQUIREMENTS OR SPECIAL CONDITIONS

12. Best Management Practices

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-220 K., and 40 CFR 122.44 (k) allow BMPs for the control of toxic pollutants listed in Section 307 (a)(1), and hazardous substances listed in Section 311 of the Clean Water Act where numeric limits are not yet imposed or BMPs are needed to accomplish the purpose/intent of the law.

Additional Discussion: The Department has developed a listing of industry-specific best management practices (BMP) that are imposed in individual VPDES permits issued to industrial activities addressed by SIC codes 3731, 3732, and/or 4499. In addition, conditions will address the permittee's site and facility specific request to prohibit in-water hull cleaning and associated waste discharges at this site.

13. Tributyltin (TBT)

Rationale: The State Water Control Law, section 62.1-44.21, authorizes the Board to request information needed to determine the discharge's impact on State waters. 9 VAC 25-31-190(H) requires the permittee to furnish information requested by the Agency to determine compliance with the permit. Requiring notification of TBT use allows the Board to determine the overall use of TBT in the region and allows the DEQ to determine when to expect TBT use reporting and discharge data.

Rationale: The State Water Control Law, section 62.1-44.21, authorizes the Board to request information needed to determine the discharge's impact on State waters. States are authorized to establish monitoring methods and procedures for reporting, compiling, and analyzing data on water quality in accordance with 40 CFR part 130 for Water Quality Planning and Management. 9 VAC 25-31-190(H) requires the permittee to furnish information requested by the Agency to determine compliance with the permit. 9 VAC 25-31-220(I) requires reporting at a frequency to be determined by the Board, but not less than once per year.

14. Water Quality Monitoring

Rationale: The State Water Control Law, Section 62.1-44.21, authorizes the Board to request information needed to determine the discharges' (401 - IWTP, 103 - CPPU) impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, subpart 131.11. If modifications to technology-based treatment requirements are proposed, 40 CFR Part 125, Criteria and Standards for the NPDES, subpart 125.63 requires the establishment of a monitoring program.

Additional Discussion: To ensure that the process wastewaters generated as a result of the permittee's process operations are dully and adequately characterized against the State's Water Quality Standards, monitoring under this condition is warranted. In this regard, it is a BPJ determination to require this action at a minimum frequency for selected groups of substances. Sampling and reporting under this permit condition will also serve to complete data entry cells appearing in EPA Form 2C, completed and submitted for point source discharges from ongoing process wastewater treatment activities. This permit requirement will apply to outfalls 040 and 401, and outfalls 100 and 103. This monitoring shall take place three years following permit reissuance and submitted 180 days prior to scheduled expiration with the application for the next permit reissuance.

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VPDES Permit Program
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Name of Condition:

C. OTHER REQUIREMENTS OR SPECIAL CONDITIONS (continued)

15. Discharges to Surface Waters in the Chesapeake Bay Watershed

Rationale: Nonsignificant dischargers are subject to aggregate wasteload allocations for total nitrogen (TN), total phosphorous (TP) and sediments under the Total Maximum Daily Load (TMDL) for Chesapeake Bay. Monitoring of TN and TP is required in order to verify the aggregate wasteload allocations. All dischargers that do not meet this definition are deemed "nonsignificant" dischargers and were included in aggregate WLAs in the TMDL. Numeric WLAs are included in the watershed general permit for all significant dischargers and new or expanding nonsignificant dischargers that meet the criteria included in Part I.G. of the general permit. In keeping with Virginia's Phase I Watershed Implementation Plan (November 29, 2010), compliance with individual numeric WLAs is not required of existing nonsignificant facilities until they expand and trigger the nutrient offset requirements included in the watershed general permit. The nutrient monitoring required by this guidance is intended to provide additional data for the reevaluation of WLAs for nonsignificant facilities. For expanding nonsignificant industrial facilities it will also serve to establish the appropriate "permitted design capacity" for the existing treatment system.

16. §316(b) Interim Best Technology Available (BTA) - Cooling Water Intake Structures

Rationale: VPDES Permit Regulation 9VAC25-31-165C. requires existing facilities with cooling water intake structures to meet the requirements under §316(b) of the Clean Water Act (CWA) determined by the department on a case-by-case, best professional judgment basis. DEQ staff have determined the permitted facility to be subject to the §316(b) requirements because it is a point source that uses or proposes to use one or more cooling water intake structures that withdraws waters of the U.S. for cooling purposes. In a supplemental e-mail to the DEQ subsequent to submission of the application, the applicant identified the intake structure to Building 174 is fitted with a passive screening device. No further information or requests were submitted by the applicant as the final discharge from the equipment cooling water activity is less that 2.0 millions of gallons per day (MGD). In this regard, it is a BPJ determination by the VaDEQ to require all facilities using ambient surface waters for cooling purposes to submit information and take necessary actions under §316(b) as appropriate to their specific activities in this regard. The terms and conditions of the proposed permit and the supporting VaDEQ rationale for their imposition into the permit at this time are based on: Final Draft Guidance, Version 4.b, §316(b) Phase II Rule Cooling Water Intake Structures at Existing VPDES Facilities, Permit Special Condition, Fact Sheet, Public Notice, Part I.A. Table, and CEDS Protocols (dated May 19, 2015)

Additional Discussions: Federal regulations at 40 CFR §§125.98(b)(5) and (b)(6) mandate that for permits issued before July 14, 2018, for which an alternate schedule has been established for the submission of information required by 40 CFR §122.21(r), must include interim

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Name of Condition:

C. OTHER REQUIREMENTS OR SPECIAL CONDITIONS (continued)

16. §316(b) Interim Best Technology Available (BTA) - Cooling Water Intake Structures (continued)

Additional Discussions (continued): BTA requirements in the permit based on best professional judgment on a site-specific basis. This special condition outlines interim BTA practices to minimize impingement and entrainment (I&E) mortality and adverse impacts to aquatic organisms.

VPDES Permit Regulation 9VAC25-31-190E. requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit.

The permittee shall, by no later than 270 days prior to the expiration date of this permit, submit to the DEQ Regional Office all applicable information described in 40CFR §122.21(r).

VPDES Permit Regulation 9VAC25-31-210A. authorizes the Board to establish permit conditions to provide for and assure compliance with all applicable requirements of the law, the CWA and regulations. Federal regulations at 40 CFR §125.96(e) requires visual inspections or the employment of remote monitoring devices to be conducted at least weekly during the period any cooling water intake structure is in operation to ensure any technologies operated are maintained and operated to function as designed, including those installed to protect Federally-listed threatened or endangered species or designated critical habitat.

40 CFR §125.96 authorizes DEQ to establish monitoring requirements, and specific protocols, as appropriate. Provisions for inspection waivers, adverse weather conditions, and deficiency discoveries were developed, using as a foundation, comparable provisions found in the VPDES General Permit for Stormwater Discharges Associated with Industrial Activity, 9 VAC 25-151-70, Part I.A.2.e, A.3. and A.6.b.

VPDES Permit Regulation 9VAC25-31-210A. authorizes the Board to establish permit conditions to provide for and assure compliance with all applicable requirements of the law, the CWA and regulations. Federal regulations at 40 CFR §125.97(c) requires the permittee to annually submit a certification statement signed by a responsible corporate officer reporting whether there have been substantial modifications to the operation at any unit at the facility that impacts cooling water withdrawals or operation of the cooling water intake structures, or if information contained in the previous year's annual certification remains pertinent.

D. TOXICS MANAGENENT PROGRAM (TMP)

Rationale: To determine the need for pollutant specific and/or whole effluent toxicity limits as may be required by the VPDES Permit Regulation, 9 VAC 25-31-220 D. and 40 CFR 122.44 (d). See Attachment 8 of this fact sheet for additional justification as prepared by the TRO's Toxics Program Manager specific to this reissuance process.

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VPDES Permit Program
List of Special Conditions & Rationale

E. STORM WATER MANAGEMENT CONDITIONS

1. Sampling Methodology - Specific Outfalls 011, 025, 032, 033, 036, 940, 044, 956, 072, 082, 086, 092, 094, 900, and 600.

   Rationale: Defines permit requirements and methodology for collecting representative effluent samples in conformance with applicable regulations.

2. Storm Water Management Evaluation

   Rationale: The Clean Water Act 402(p)(2)(B) requires permits for storm water discharges associated with industrial activity. VPDES permits for storm water discharges must establish BAT/BCT requirements in accordance with §402(p)(3) of the Act. The Storm Water Pollution Prevention Plan is the vehicle proposed by EPA in the final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity (Federal Register Sept 9, 1992) to meet the requirements of the Act. Additionally, the VPDES Permit Regulation, 9 VAC 25-31-220 K., and 40CFR 122.44(k) allow BMPs for the control of toxic pollutants listed in §307(a)(1), and hazardous substances listed in §311 of the Clean Water Act where numeric limits are infeasible or BMPs are needed to accomplish the purpose/intent of the law.

   Finally, the EPA produced a document dated August 1, 1996, entitled "Interim Permitting Approach for Water Quality- Effluent Limitations in Storm Water Permits". This document indicated that an interim approach to limiting storm water could be through the use of best management practices rather than numerical limits. EPA pointed out that Section 502 of the Clean Water Act (CWA) defined "effluent limitation" to mean "any restriction on quantities, rates, and concentrations of constituents discharged from point sources. The CWA does not say that effluent limitations need be numeric." The use of BMPs falls in line with the Clean Water Act which notes the need to control these discharges to the maximum extent necessary to mitigate impacts on water quality.

3. Benchmark Concentration Values

   Rationale: This permit condition is required by current and relevant staff guidance (VaDEQ Guidance Memo Number 14-2003, VPDES Permit Manual Revisions, dated March 27, 2014).

4. General Conditions

   a. Sample Type

      Rationale: This stipulates the proper sampling methodology for qualifying rain events from regulated storm water outfalls. Use of this condition is a BPJ determination based on the EPA storm water multi-sector general permit for industrial activities and DEQ's general permit for storm water associated with industrial activities and is consistent with those permits.

   b. Recording of Results

      Rationale: This sets forth the information which must be recorded and reported for each storm event sampling (e.g., date and duration event, rainfall measurement, and duration between qualifying events). It also requires the maintenance of daily rainfall logs which are to be reported. This condition is

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List of Special Conditions & Rationale

E. STORM WATER MANAGEMENT CONDITIONS

4. General Conditions (continued)

carried over from the previous storm water pollution prevention plan requirements contained in the DEQ's storm water baseline industrial general permit.

c. Sampling Waiver

Rationale: This condition allows the permittee to collect substitute samples of qualifying storm events in the event of adverse climatic conditions. Using this condition is a BPJ determination based on EPA storm water multi-sector GP permit for industrial activities and is consistent with that permit.

d. Representative Outfalls - Substantially Identical Discharges

Rationale: This condition allows the permittee to submit the results of sampling from one outfall as representative of other similar outfalls, provided the permittee can demonstrate that the outfalls are substantially identical. Use of this condition is a BPJ determination based on the EPA storm water multi-sector general permit for industrial activities and is consistent with that permit.

e. Quarterly Visual Examination of Storm Water Quality - Outfalls 011, 025, 032, 033, 036, 940, 044, 956, 072, 082, 086, 092, 094, 900, and 600.

Rationale: This condition requires visual examinations of storm water outfalls take place at specified frequency and sets forth what information needs to be checked and documented. These examinations assist with the evaluation of the pollution prevention plan by providing a simple, low cost means of assessing the quality of storm water discharge with immediate feedback. Use of this condition is a BPJ determination based on the EPA storm water multi-sector general permit for industrial activities and is consistent with that permit.

f. Allowable Non-Storm Water Discharges

Rationale: The listed allowable non-storm water discharges are the same as those allowed by the EPA in their multi-sector general permit, and are the same non-storm water discharges allowed under the Virginia General VPDES Permit for Discharges of Storm Water Associated with Industrial Activity, 9 VAC 25-151-10 et seq. Allowing the same non-storm water discharges in VPDES individual permits provides consistency with other storm water permits for industrial facilities. The non-storm water discharges must meet the conditions in the permit.

g. Releases of Hazardous Substances or Oil in Excess of Reportable Quantities

Rationale: This condition requires that the discharge of hazardous substances or oil from a facility be eliminated or minimized in accordance with the facility's storm water pollution prevention plan. If there is a discharge of a material in excess of a reportable quantity, it establishes the reporting requirements in accordance with state laws and federal

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E. STORM WATER MANAGEMENT CONDITIONS

4. General Conditions (continued)

regulations. In addition, the pollution prevention plan for the facility must be reviewed and revised as necessary to prevent a reoccurrence of the spill. Use of this condition is a BPJ determination based on the EPA storm water multi-sector general permit for industrial activities and is consistent with that permit.

h. Water Quality Protections, i. Corrective Actions, and j. Additional Requirements for Salt Storage

Rationale: This permit condition is required by current and relevant staff guidance (VaDEQ Guidance Memo Number 14- 2003, VPDES Permit Manual Revisions, dated March 27, 2014).

5. Storm Water Pollution Prevention Plan

Rationale: The Clean Water Act 402(p) (2) (B) requires permits for storm water discharges associated with industrial activity. VPDES permits for storm water discharges must establish BAT/BCT requirements in accordance with 402(p)(3) of the Act. The Storm Water Pollution Prevention Plan is the vehicle proposed by EPA in the final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity (Federal Register Sept 9, 1992) to meet the requirements of the Act. Additionally, the VPDES Permit Regulation, 9 VAC 25-31-220 K., and 40 CFR 122.44 (k) allow BMPs for the control of toxic pollutants listed in Section 307 (a)(1), and hazardous substances listed in Section 311 of the Clean Water Act where numeric limits are infeasible or BMPs are needed to accomplish the purpose/intent of law.

6. Facility-Specific Storm Water Management Conditions

Rationale: These conditions set forth additional site-specific storm water pollution prevention plan requirements. Use of these conditions is a BPJ determination based on the EPA storm water multi-sector general permit for industrial activities and DEQ's general permit for storm water associated with industrial activities and is consistent with those permits.

a. Fabricated Metal Products

Additional Discussion: The applicant's industrial activities includes the on-site preparation and fabrication of various pieces of equipment and vessel parts, from raw materials. Subsequent activities to finish fabricated metal products are also performed at the facility. Wastewaters associated with metal fabrication and finishing are collected and diverted to an on-site IWTP for complete treatment prior to limited discharge from internal outfall 401. This suite of permit conditions is continued from the current permit.

b. Water Transportation

Additional Discussion: The applicant's industrial activities includes the on-site operation of tugs, tow boats, barges used for collection and transportation of process wastewaters, and harbor patrol vessels deployed for facility security missions. This aspect is being incorporated into the permit at this time.

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List of Special Conditions & Rationale

E. STORM WATER MANAGEMENT CONDITIONS

6. Facility-Specific Storm Water Management Conditions (continued)

c. Ship and Boat Building and Repair Yards

Additional Discussion: The primary mission of the Shipyard is the repair and maintenance of Vessels of the Armed Forces for the U. S. Navy. This suite of permit conditions is continued from the current permit.

ATTACHMENT 8

TOXICS MONITORING/TOXICS REDUCTION/ WET LIMIT RATIONALE

MEMORANDUM
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
TIDEWATER REGIONAL OFFICE

5636 Southern Boulevard Virginia Beach, Virginia 23462

SUBJECT: Reissuance of VPDES Permit Number VA0005215
Norfolk Naval Shipyard, Portsmouth, Virginia
Whole Effluent Toxicity language for Norfolk Naval Shipyard (VA0005215)

TO: Carl Thomas

FROM: Deanna Austin

DATE: August 10, 2015

COPIES: Fact Sheet

Norfolk Naval Shipyard is located in Portsmouth, VA. There are a number of outfalls onsite and a select few that required toxicity monitoring during the last permit term. All outfalls in the TMP program discharge to the Southern Branch of the Elizabeth River. The table below details both the outfalls that have been sampled during the most recent permit term and outfalls that will be new to the TMP program.

Outfall Number	Discharge Sources
401	IWTP effluent
103	Oil and metal bearing WW from vessel maintenance and repair activities and contaminated SW.
200, 400, 500	Hull preparation WW, WW from tank and bilge cleaning, contaminated SW and any other WW from drydock events.
011	Industrial SW
032	Industrial SW
033	Industrial SW
044	Industrial SW
072	Industrial SW
086	Industrial SW

The data below documents the outfalls for which toxicity monitoring was performed during the recent permit term. All samples taken had analysis performed by JR Reed.

OUTFALL	WET DESCRIPTION	SPECIES	SAMPLE DATE	LC50	% SURVIVAL	TU
011	SW Annual Acute	A.b.	04/05/11	100	100	1
011	SW Annual Acute	C.v.	04/05/11	100	100	1
011	SW Annual Acute	A.b.	08/06/12	100	100	1
011	SW Annual Acute	C.v.	08/06/12	100	100	1
011	SW Annual Acute	C.v.	02/26/13	100	100	1
011	SW Annual Acute	A.b.	02/26/13	100	100	1
011	SW Annual Acute	A.b.	04/07/14	100	100	1
011	SW Annual Acute	C.v.	04/07/14	100	100	1
011	SW Annual Acute	A.b.	04/30/15	100	100	1
011	SW Annual Acute	C.v.	04/30/15	100	100	1
OUTFALL	WET DESCRIPTION	SPECIES	SAMPLE DATE	LC50	% SURVIVAL	TU
032	SW Annual Acute	A.b.	10/13/11	100	95	1
032	SW Annual Acute	A.b.	05/30/12	100	100	1
032	SW Annual Acute	A.b.	11/07/13	100	100	1
032	SW Annual Acute	A.b.	04/07/14	100	100	1

OUTFALL	WET DESCRIPTION	SPECIES	SAMPLE DATE	LC50	% SURVIVAL	TU
033	SW Annual Acute	A.b.	10/13/11	100	95	1
033	SW Annual Acute	A.b.	05/30/12	100	100	1
033	SW Annual Acute	A.b.	12/07/13	100	100	1
033	SW Annual Acute	A.b.	04/07/14	100	100	1
OUTFALL	WET DESCRIPTION	SPECIES	SAMPLE DATE	LC50	% SURVIVAL	TU
401	Semi-annual Acute	A.b.	07/12/10	100	100	1
401	Semi-annual Acute	A.b.	03/02/11	100	80	1
401	Semi-annual Acute	A.b.	11/07/11	100	100	1
401	Semi-annual Acute	A.b.	01/18/12	100	90	1
401	Semi-annual Acute	A.b.	11/06/12	100	100	1
401	Semi-annual Acute	A.b.	01/14/13	100	95	1
401	Semi-annual Acute	A.b.	11/04/13	100	70	1
401	Semi-annual Acute	A.b.	04/02/14	100	100	1
401	Semi-annual Acute	A.b.	10/16/14	100	100	1
401	Semi-annual Acute	A.b.	02/09/15	100	100	1
OUTFALL	WET DESCRIPTION	SPECIES	SAMPLE DATE	LC50	% SURVIVAL	TU
044	SW Annual Acute	A.b.	10/13/11	100	100	1
044	SW Annual Acute	A.b.	05/30/12	100	100	1
044	SW Annual Acute	A.b.	12/07/13	100	100	1
044	SW Annual Acute	A.b.	04/07/14	100	100	1
OUTFALL	WET DESCRIPTION	SPECIES	SAMPLE DATE	LC50	% SURVIVAL	TU
072	SW Annual Acute	A.b.	04/05/11	100	100	1
072	SW Annual Acute	C.v.	04/05/11	100	100	1
072	SW Annual Acute	A.b.	08/06/12	100	100	1
072	SW Annual Acute	C.v.	08/06/12	100	100	1
072	SW Annual Acute	C.v.	02/26/13	100	100	1
072	SW Annual Acute	A.b.	02/26/13	100	100	1
072	SW Annual Acute	A.b.	04/07/14	100	100	1
072	SW Annual Acute	C.v.	04/07/14	100	100	1
072	SW Annual Acute	A.b.	04/30/15	100	100	1
072	SW Annual Acute	C.v.	04/30/15	100	100	1
OUTFALL	WET DESCRIPTION	SPECIES	SAMPLE DATE	LC50	% SURVIVAL	TU
086	SW Annual Acute	A.b.	04/05/11	100	100	1
086	SW Annual Acute	A.b.	05/30/12	100	95	1
086	SW Annual Acute	A.b.	02/26/13	100	90	1
086	SW Annual Acute	A.b.	04/07/14	100	100	1
086	SW Annual Acute	A.b.	04/30/15	100	100	1

OUTFALL	WET DESCRIPTION	SPECIES	SAMPLE DATE	LC50	% SURVIVAL	TU
103	Annual Acute	C.v.	05/18/11	100	100	1
103	Annual Acute	A.b.	05/18/11	100	100	1
103	Annual Acute	A.b.	05/01/12	100	100	1
103	Annual Acute	C.v.	05/01/12	100	100	1
103	Annual Acute	A.b.	11/06/13	100	100	1
103	Annual Acute	C.v.	11/06/13	100	100	1
103	Annual Acute	A.b.	05/06/14	100	90	1
103	Annual Acute	C.v.	05/06/14	100	100	1
OUTFALL	WET DESCRIPTION	SPECIES	SAMPLE DATE	LC50	% SURVIVAL	TU
200	Annual Acute	A.b.	01/18/11	100	100	1
200	Annual Acute	A.b.	11/07/12	100	100	1
200	Annual Acute	A.b.	06/11/13	100	100	1
200	Annual Acute	A.b.	06/11/14	100	100	1
OUTFALL	WET DESCRIPTION	SPECIES	SAMPLE DATE	LC50	% SURVIVAL	TU
400	Annual Acute	A.b.	04/05/11	100	100	1
400	Annual Acute	A.b.	09/11/12	100	100	1
400	Annual Acute	A.b.	06/20/13	100	100	1
400	Annual Acute	A.b.	05/06/14	100	100	1
OUTFALL	WET DESCRIPTION	SPECIES	SAMPLE DATE	LC50	% SURVIVAL	TU
500	Annual Acute	A.b.	04/05/11	100	100	1
500	Annual Acute	A.b.	11/07/12	100	100	1
500	Annual Acute	A.b.	10/30/13	100	100	1
500	Annual Acute	A.b.	04/24/14	100	100	1

Americamysis bahia (A.b.). *Cyprinodon variegatus* (C.v.)

Outfalls 103, 401, 200, 400, and 500 had previously approved effluent mixing zone evaluations. The approved mixes were reviewed by the application and verified with the application submitted for reissuance. The following table shows the effluent mixing zone evaluations to be used during permit preparation.

Outfall	Mix
103	10:1
200	13:1
400	14:1
500	13:1
401	19.1

Outfall 103 has had complete compliance with the toxicity monitoring program for the past 2 permit terms. Additionally, 103 is an internal outfall with no WET limit. Because of this, the outfall is going to be removed from the WET monitoring program for the upcoming permit term.

Outfalls 200, 400, and 500 are the drydock discharges. Toxicity monitoring at these outfalls have shown no toxicity issues during the last two permit terms. Toxicity monitoring will remain at outfalls 200, 400, and 500 to be consistent with the other shipyards in this area. Monitoring will continue with A.b. The dilution ratios for these outfalls are shown in the table below.

Outfalls 200 and 500	Outfall 400
Acute dilution = $100/IWC_a$	Acute dilution = $100/IWC_a$
$13 = 100/IWC_a$	$14 = 100/IWC_a$
$100/13 = 7.69\%\ IWC_a$	$100/14 = 7.14\%\ IWC_a$
LC_{50} = IWC/Acute Water Quality Instream criterion	LC_{50} = IWC/Acute Water Quality Instream criterion
$LC_{50} = 7.69/0.3 = 25.6\%$ (round to 26% effluent)	$LC_{50} = 7.14/0.3 = 23.8\%$ (round to 24% effluent)
$TU_a = 1/LC_{50} \times 100$	$TU_a = 1/LC_{50} \times 100$
$1/26 \times 100 = 3.85$	$1/24 \times 100 = 4.16$
$TU_a = 3.9$	$TU_a = 4.2$

Outfall 401 has been monitored semi-annually during the current permit term. During the last reissuance a new mixing analysis was approved and the WET limit increased. The facility has been in compliance with the new limit the entire permit term. There has been no evidence of toxicity at this outfall during the last 10 years. Because of this, the monitoring frequency will be decreased to annually. The WET limit is shown below.

Acute Dilution = $100/IWC_a$

$19 = 100/IWCa$

$100/19 = 5.26\%\ IWC_a$

LC_{50} = IWC/Acute Water Quality Instream Criterion

$LC_{50} = 5.26/0.3 = 17.5\%$

$TU_a = 1/LC_{50} \times 100$

$1/17.5 \times 100 = 5.71$

$TU_a = 5.71$

The final WET limitation will remain in the permit as 5.71 to be consistent with DEQ's Significant Figures Guidance Document 06-2016.

Stormwater TMP

Stormwater monitoring results over the past permit term have shown no toxicity. Based upon the review of the permit writer (C. Thomas), toxicity screening will be removed from the stormwater outfalls, although Part I.A. monitoring will continue. If future trends in metals' or TSS values increase during the upcoming permit term, the decision to have toxicity screening on stormwater will be revisited, at the next reissuance.

The following toxicity language is recommended for the reissuance of the Norfolk Naval Shipyard permit (VA0005215).

Proposed permit content for Part I.B.

B. WHOLE EFFLUENT TOXICITY (WET) LIMITATION MONITORING REQUIREMENTS FOR OUTFALL 401

1. The Whole Effluent Toxicity (WET) Limitation in Part I.A. for outfall 401 is a final limit effective with the issuance of this permit. The limit is:

   Acute 5.71 TU_a (LC_{50} ≥17.5%)

2. Commencing with the effective date of the permit, the permittee shall conduct annual acute toxicity tests using 8-hour flow-proportioned composite samples of final effluent from outfall 401. Toxicity samples shall be taken at the same time as the other sampling for chemical parameters required in Part I.A. of this permit. The acute test to use is:

   48-Hour Static Acute test using Americamysis bahia (A.b.)

   a. The acute test shall be performed with a minimum of 5 dilutions, derived geometrically, for calculation of a valid LC_{50} and corresponding acute Toxic Units (TU_a). Express as TU_a by dividing $100/LC_{50}$ for DMR reporting.

   b. One complete copy of the toxicity test report shall be submitted with the DMR. A complete report must contain a copy of all laboratory benchsheets, certificates of analysis, and all chains of custody.

   c. Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3.

3. The permit may be modified or, alternatively, revoked and reissued to include pollutant specific limits in lieu of a WET limit should it be demonstrated that toxicity is due to specific parameters. The pollutant specific limits must control the toxicity of the effluent.

Proposed permit content for Part I.D.

D. TOXICS MANAGEMENT PROGRAM (TMP)

1. Biological Monitoring

a. In accordance with the schedule in D.2.below, the permittee shall conduct annual toxicity tests for the duration of the permit.

The permittee shall collect 8-hour flow-proportioned composite samples of final effluent from outfalls 200, 400, and 500 in accordance with the sampling methodology in Part I.A. of this permit. The grab samples for toxicity testing shall be taken at the same time as the other sampling for chemical parameters required in Part I.A. of this permit.

For outfalls 200, 400, and 500, the tests to use are:

48-Hour Static Acute test using Americamysis bahia (A.b.)

b. The acute tests shall be performed with a minimum of 5 dilutions, derived geometrically, for the calculation of a valid LC_{50}. Express the results as Acute Toxic Units (TU_a) by dividing 100/ LC_{50} for reporting.

Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3.

c. In the event that sampling of any of the outfalls is not possible due to the absence of effluent flow during a particular testing period, the permittee shall perform a make-up sample during the next testing period.

d. The permittee may provide additional samples to address data variability during the period of initial data generation. These data shall be reported and may be included in the evaluation of the effluent toxicity. Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.3.

e. The test dilutions shall be able to determine compliance with the following endpoints:

(1) For outfalls **200** and **500**: Acute LC_{50} of >26% equivalent to a TU_a of 3.9; and

(2) For outfall **400**: Acute LC_{50} of >24% equivalent to a TU_a of 4.2.

2. Reporting Schedule

The permittee shall report the results and supply **one** complete copy of the toxicity test reports to the Tidewater Regional Office in accordance with the schedule below. A complete report must contain a copy of all laboratory benchsheets, certificates of analysis, and all chains of custody. All data shall be submitted within sixty (60) days of the sample date.

Proposed permit content for Part I.D.

2. Reporting Schedule (continued)

(a)	Conduct first annual TMP tests for outfalls 200, 400, and 500 using Americamysis bahia.	By December 31, 2016
(b)	Submit results of all biological tests	Within 60 days of the sample date and no later than January 10, 2017
(c)	Conduct subsequent annual TMP tests for the outfalls listed above in (a)	By December 31, 2017, 2018, and 2019
(d)	Submit subsequent annual biological tests	Within 60 days of the sample date and no later than January 10, 2018, 2019 and 2020

Thomas, Carl (DEQ)

From: Austin, Deanna (DEQ)
Sent: Tuesday, August 11, 2015 7:36 AM
To: Thomas, Carl (DEQ)
Cc: Sauer, Mark (DEQ)
Subject: Review of NNSY VA0005215
Attachments: NNSY 8-2015.docx; TMP Norfolk Naval Shipyard VA0005215.doc

Here you go. Also, the toxics review is attached.

Deanna Austin
DEQ-TRO Water Permits
5636 Southern Blvd
Virginia Beach, VA 23462
Phone: 757-518-2008
Fax: 757-518-2009

ATTACHMENT 9

MATERIAL STORED

ATTACHMENT 9
MATERIALS STORED AND HANDLED

General Discussion:

In the application, the applicant noted the location and means of exposed storage of numerous materials throughout the shipyard. This information covered several double-sided pages in the 2015-2020 permit application and will not be provided with this attachment to the fact sheet.

The permittee maintains a vigorous facility and waterfront industrial activity inspection program focused upon all areas where industrial activities are routinely performed and materials stored in an exposed manner.

When releases, spills and/or discharges of probable pollutants occur, the facility responds in a timely manner to remediate any potential for adverse environmental impact and investigate the causative factors leading to the release. In this regard, the applicant is fully meeting the intent, terms, and conditions of the permit.

If additional information is required, refer to the permit application submitted to the TRO on December 22, 2014.

ATTACHMENT 10

RECEIVING WATERS INFO./ TIER DETERMINATION/STORET DATA/ STREAM MODELING AND 303(D) LISTED SEGMENTS

TMDL Permit Review

Date: May 12, 2015
To: Jennifer Howell, TRO Planning √ JSH 6/18/2015
Permit Writer: C. Thomas, TRO Water Permits
Facility: US – Norfolk Naval Shipyard
Permit Number: VA0005215

Issuance, Reissuance or Modification (if Modification describe): Regular reissuance

Permit Expiration Date: June 29, 2015 (to be administratively continued)

Waterbody ID (ex: VAT-G15E): VAT-G15E
Topo Name: Norfolk South (035D)

Facility Address: Norfolk Naval Shipyard,
Code 106, Building M-22, Portsmouth, Virginia 23709

Receiving Stream: Southern Branch, Elizabeth River

Stream Name: Noted above.	
Stream Data Requested? Yes, T°C, salinity, pH, **dissolved metals**, DO, nutrients (N, P) - all those data for last 3 years	
Outfall Numbers: Refer to application package	Lat/Long: Refer to application package

Is there a design flow change? NO If yes give the change.

TMDL Review:

Is a TMDL IN PROGRESS for the receiving stream? Yes, a PCB TMDL for tidal James River and Elizabeth River watersheds has an anticipated completion date of 2015.	
Has a TMDL been APPROVED that includes the receiving stream?	
Yes, see below	
If yes, Include TMDL Name, Pollutant(s) and date of approval:	
1) Chesapeake Bay TMDL EPA approved 12/29/2010 : nitrogen, phosphorus, and TSS 2) Bacteria TMDL Development for the Elizabeth River Watershed. EPA approved 7/20/2010, SWCB approved 9/30/2010: *enterococci*	
Is the facility assigned a WLA from the TMDL?	No, see below
If Yes, what is the WLA?	
1) VA0005215 was listed in the Chesapeake Bay TMDL under Bay segment SBEMH as a non-significant discharger. Because an aggregated WLA exists, this permit did not receive an individual WLA. The aggregated WLA is presented as a delivered load for each of the impaired 92 Bay segments. (TMDL Report-Appendix Q) 2) VA0005215 was listed in the Bacteria TMDL Development for the Elizabeth Watershed report (TMDL Report-Appendix B) as a permitted facility within the watershed. No WLA was assigned to this permit because it is not considered a contributor of the TMDL pollutant.	

Review will be completed in 30 days of receipt of request.

Additional Comments:

2012 Impaired Waters - 303(d) List

Category 5 - Waters needing Total Maximum Daily Load Study

James River Basin

Cause Group Code / Impaired Use	Water Name / Cause	Cause Category	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)	Initial List Date	TMDL Dev. Date
G01E-02-EBEN	James River						
Aquatic Life	Estuarine Bioassessments	5A	31.343			2012	2024
G01E-03-PCB	James River and Various Tributaries						
Fish Consumption	PCB in Fish Tissue	5A	62.773			2002	2014
	PCB in Fish Tissue	5A	1.837			2004	2016
	PCB in Fish Tissue	5A	191.964		7.49	2006	2018
	PCB in Fish Tissue	5A	0.012			2008	2014
	PCB in Fish Tissue	5A	0.003			2010	2018
G01L-01-DO	Falling Creek Reservoir						
Aquatic Life	Oxygen, Dissolved	5A		88.37		2012	2024
G01R-01-PCB	Goode Creek						
Fish Consumption	PCB in Water Column	5A			1.25	2012	2024
G01R-02-CU	XVP - Almond Creek, UT						
Aquatic Life	Copper	5A			0.36	2012	2024
Wildlife	Copper	5A			0.36	2012	2024
G01R-02-PCB	Almond Creek						
Fish Consumption	PCB in Water Column	5A			2.36	2012	2024
G01R-02-PH	XVO and XVP (Almond Creek, UTs)						
Aquatic Life	pH	5A			0.82	2004	2016
G01R-02-ZN	XVP - Almond Creek, UT						
Aquatic Life	Zinc	5A			0.36	2012	2024
Wildlife	Zinc	5A			0.36	2012	2024
G01R-04-DO	Falling Creek						
Aquatic Life	Oxygen, Dissolved	5A			0.98	2008	2020
G01R-05-PH	Kingsland Creek						
Aquatic Life	pH	5C			8.50	2006	2018
G01R-06-PCB	Gillies Creek						
Fish Consumption	PCB in Water Column	5A			6.02	2012	2024
G01R-06-PH	Gillies Creek						
Aquatic Life	pH	5A			6.02	2004	2016
G01R-07-DO	Redwater Creek						
Aquatic Life	Oxygen, Dissolved	5C			2.94	2010	2022
G01R-09-DO	UT to James River - XPF						
Aquatic Life	Oxygen, Dissolved	5C			0.39	2004	2016
G01R-09-PH	UT to James River - XPF						
Aquatic Life	pH	5C			0.39	2004	2016
G01R-12-DO	Coles Run, UT						
Aquatic Life	Oxygen, Dissolved	5C			0.63	2006	2018

2012 Impaired Waters - 303(d) List

Category 5 - Waters needing Total Maximum Daily Load Study

James River Basin

Cause Group Code / Impaired Use	Water Name / Cause	Cause Category	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)	Initial List Date	TMDL Dev. Date
G14L-03-DO	Lake Prince Reservoir						
Aquatic Life	Oxygen, Dissolved	5A		708.85		2006	2018
G14R-01-BEN	Carbell Swamp - Upper						
Aquatic Life	Benthic-Macroinvertebrate Bioassessments	5A			2.55	2004	2016
G14R-01-PH	Carbell Swamp - Upper						
Aquatic Life	pH	5A			2.55	2002	2014
G14R-02-BAC	Carbell Swamp - Lower						
Recreation	Escherichia coli	5A			2.86	2010	2022
G14R-02-DO	Carbell Swamp - Lower						
Aquatic Life	Oxygen, Dissolved	5A			2.86	2008	2020
G15E-01-01-TCDD	Elizabeth River Southern Branch and its tidal tributaries. CBP segment SBEMH.						
Fish Consumption	Dioxin (including 2,3,7,8-TCDD)	5A	3.137			2010	2022
G15E-02-04-EBEN	Eastern Branch Elizabeth River, Broad Creek and Unsegmented estuaries in EBEMH						
Aquatic Life	Estuarine Bioassessments	5A	1.759			2004	2016
	Estuarine Bioassessments	5A	0.586			2006	2018
G15E-03-01-EBEN	Elizabeth River Mainstem						
Aquatic Life	Estuarine Bioassessments	5A	4.528			2004	2016
	Estuarine Bioassessments	5A	3.440			2010	2022
G15E-04-02-EBEN	Western Branch Elizabeth River and Unsegmented estuaries in WBEMH						
Aquatic Life	Estuarine Bioassessments	5A	0.562			2006	2018
	Estuarine Bioassessments	5A	2.166			2010	2022
G15E-06-01-BAC	Hampton River						
Recreation	Enterococcus	5A	0.006			2006	2024
	Enterococcus	5A	0.545			2010	2022
G15E-06-02-BAC	James River - Anderson Park Beach						
Recreation	Enterococcus	5A	0.010			2012	2024
G15E-06-03-BAC	Hoffler Creek						
Recreation	Enterococcus	5A	0.057			2008	2020
H01R-01-HG	James River						
Fish Consumption	Mercury in Fish Tissue	5A			15.55	2010	2022
H03R-01-BEN	Blackwater Creek						
Aquatic Life	Benthic-Macroinvertebrate Bioassessments	5A			10.30	2010	2022
H03R-03-BEN	Ivy Creek						
Aquatic Life	Benthic-Macroinvertebrate Bioassessments	5A			20.80	2010	2022
H03R-04-PCB	James River						
Fish Consumption	PCB in Fish Tissue	5A			10.53	2004	2016
	PCB in Fish Tissue	5A			164.27	2006	2016
	PCB in Fish Tissue	5A			3.88	2008	2016
	PCB in Fish Tissue	5A			23.10	2008	2018

Appendix 5 - List of Impaired (Category 5) Waters in 2012

James River Basin

Cause Group Code: **G01E-03-PCB** **James River and Various Tributaries**

Location: Estuarine James River from the fall line to the Hampton Roads Bridge Tunnel, including several tributaries listed below.

City / County: Charles City Co, Chesapeake City, Chesterfield Co, Colonial Heights City, Dinwiddie Co, Hampton City, Henrico Co, Hopewell City, Isle Of Wight Co, James City Co, New Kent Co, Newport News City, Norfolk City, Petersburg City, Portsmouth City, Prince George Co, Richmond City, Suffolk City, Surry Co, Virginia Beach City, Williamsburg City

Use(s): Fish Consumption

Cause(s) /
VA Category: PCB in Fish Tissue / 5A

During the 2002 cycle, the James River from the Fall line to Queens Creek was considered not supporting of the Fish Consumption Use due to PCBs in multiple fish species at multiple DEQ monitoring locations.

During the 2004 cycle, a VDH Fish Consumption Restriction was issued from the fall line to Flowerdew Hundred and the segment was adjusted slightly to match the Restriction. In addition, in the 2004 cycle, the Chickahominy River from Walkers Dam to Diascund Creek was assessed as not supporting the Fish Consumption Use because the DEQ screening value for PCBs was exceeded in 3 species during sampling in 2001.

During the 2006 cycle, the VDH restriction was extended on 12/13/2004 to extend from the I-95 bridge downstream to the Hampton Roads Bridge Tunnel and include the tidal portions of the following tributaries:

Appomattox River up to Lake Chesdin Dam
Bailey Creek up to Route 630
Bailey Bay
Chickahominy River up to Walkers Dam
Skiffes Creek up to Skiffes Creek Dam
Pagan River and its tributary Jones Creek
Chuckatuck Creek
Nansemond River and its tributaries Bennett Creek and Star Creek
Hampton River
Willoughby Bay and the Elizabeth R. system (Western, Eastern, and Southern Branches and Lafayette R.) and tributaries St. Julian Creek, Deep Creek, and Broad Creek

The advisory was modified again on 10/10/2006 to add Poythress Run.

The impairments were combined. The TMDL for the lower extended portion is due in 2018.

James River and Various Tributaries **Fish Consumption**	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
PCB in Fish Tissue - Total Impaired Size by Water Type:	**256.589**		**7.49**

Sources:

Contaminated Sediments
Source Unknown
Sources Outside State Jurisdiction or Borders

Appendix 5 - List of Impaired (Category 5) Waters in 2012

James River Basin

Cause Group Code: **G15E-01-01-TCDD** **Elizabeth River Southern Branch and its tidal tributaries. CBP segment SBEMH.**

Location: This cause encompasses the entirety of the Southern Branch Elizabeth River and its tidal tributaries.

City / County: Chesapeake City Norfolk City Portsmouth City

Use(s): Fish Consumption

Cause(s) /
VA Category: Dioxin (including 2,3,7,8-TCDD) / 5A

The Fish Consumption Use is impaired based on the VDH fish consumption advisory within the Southern Branch Elizabeth River and its tidal tributaries for Dioxin in Blue Crab hepatopancreas contamination, issued by the VDH 1/23/09.

Elizabeth River Southern Branch and its tidal tributaries. CBP segment SBEMH.	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
Fish Consumption			
Dioxin (including 2,3,7,8-TCDD) - Total Impaired Size by Water Type:	**3.137**		

Sources:

Source Unknown

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

2012 Impaired Waters (Category 4A) TMDL Approved and (Category 4B) Other Control Measures Present*

James River Basin

Cause Group Code / Impaired Use	Water Name / Cause	Cause Category	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)	Initial List Date	TMDL Dev. Date
G11E-06-SF	Lawnes Creek						
Shellfishing	Fecal Coliform	4A	0.292			1998	2010
G11E-10-SF	Pagan River - Middle						
Shellfishing	Fecal Coliform	4A	1.558			2008	2010
G11E-16-SF	Pagan River, Cypress & Jones Creeks & Brewers Creeks						
Shellfishing	Fecal Coliform	4A	0.260			1998	2010
G11E-17-SF	Ballard Creek & Bay, James River - Ballard Swamp Area and Kings Creek & Bay - James River South Shore Tributary						
Shellfishing	Fecal Coliform	4A	0.096			1998	2010
G11R-01-BAC	Baptist Run						
Recreation	Fecal Coliform	4A			3.05	2004	2016
G13E-12-BAC	Bennett Creek, Tributary to Nansemond River						
Recreation	Enterococcus	4A	0.468			2004	2016
G13E-12-SF	Bennett, Bleakhorn and Knotts Creek						
Shellfishing	Fecal Coliform	4A	0.620			1998	2010
G13E-13-BAC	Upper Nansemond River and Shingle Creek						
Recreation	Enterococcus	4A	0.301			1994	2010
G13E-13-SF	Nansemond River Mainstem, Western Branch, Shingle, Burnetts Mill, Star & Oyster House Creeks and Unsegmented Estuaries - Upper Nansemond River						
Shellfishing	Fecal Coliform	4A	2.305			1994	2010
	Fecal Coliform	4A	0.288			1998	2010
G13E-14-SF	Nansemond River Mainstem - Upper, at mouth of Knotts Creek						
Shellfishing	Fecal Coliform	4A	0.297			2010	2022
G15E-02-02-BAC	Elizabeth River Upper Mainstem, Eastern Branch, Broad Creek, Southern Branch and Paradise Creek Recreation Impairment						
Recreation	Enterococcus	4A	0.963			1998	2010
	Enterococcus	4A	0.539			2006	2018
G15E-02-05-BAC	Indian River, tributary of Eastern Branch, Elizabeth River						
Recreation	Enterococcus	4A	0.268			2002	2014
G15E-04-01-BAC	Western Branch, Elizabeth River Recreation Use Impairment						
Recreation	Enterococcus	4A	0.562			2004	2016
G15E-05-02-BAC	Lafayette River - Upper & Knitting Mill Creek						
Recreation	Enterococcus	4A	1.763			2002	2014
H01R-01-BAC	Reed Creek						
Recreation	Escherichia coli	4A			8.37	2004	2010

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

2012 Impaired Waters (Category 4A) TMDL Approved and (Category 4B) Other Control Measures Present*

James River Basin

Cause Group Code / Impaired Use	Water Name / Cause	Cause Category	Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)	Initial List Date	TMDL Dev. Date
JMSMH-DO-BAY	James River CBP segment JMSMH and Tidal Tributaries						
Aquatic Life	Oxygen, Dissolved	4A	100.291			1998	2010
	Oxygen, Dissolved	4A	18.371			2006	2010
Open-Water Aquatic Life	Oxygen, Dissolved	4A	100.291			1998	2010
	Oxygen, Dissolved	4A	18.371			2006	2010
JMSOH-DO-BAY	James River Oligohaline Estuary						
Aquatic Life	Oxygen, Dissolved	4A	48.740			2006	2010
Open-Water Aquatic Life	Oxygen, Dissolved	4A	2.212			2006	2010
JMSPH-BNUT-BAY	James River CBP segment JMSPH and Tidal Tributaries						
Aquatic Life	Nutrient/Eutrophication Biological Indicators	4A	25.011			2010	2010
JMSPH-DO-BAY	James River CBP segment JMSPH and Tidal Tributaries						
Aquatic Life	Oxygen, Dissolved	4A	0.547			2006	2010
Open-Water Aquatic Life	Oxygen, Dissolved	4A	0.547			2006	2010
JMSTFL-DO-BAY	James River Tidal Freshwater (Lower) Estuary						
Aquatic Life	Oxygen, Dissolved	4A	0.123			1994	2010
	Oxygen, Dissolved	4A	28.981			2006	2010
	Oxygen, Dissolved	4A	0.049			2008	2010
Open-Water Aquatic Life	Oxygen, Dissolved	4A	0.123			1994	2010
	Oxygen, Dissolved	4A	28.981			2006	2010
	Oxygen, Dissolved	4A	0.049			2008	2010
JMSTFL-SAV-BAY	James River Tidal Freshwater (Lower) Estuary						
Aquatic Life	Aquatic Plants (Macrophytes)	4A	29.103			2006	2010
	Aquatic Plants (Macrophytes)	4A	0.049			2008	2010
Shallow-Water Submerged Aquatic Vegetation	Aquatic Plants (Macrophytes)	4A	29.103			2006	2010
	Aquatic Plants (Macrophytes)	4A	0.049			2008	2010
JMSTFU-DO-BAY	James River Tidal Freshwater (Upper) Estuary						
Aquatic Life	Oxygen, Dissolved	4A	7.773			2010	2010
JMSTFU-SAV-BAY	James River Tidal Freshwater (Upper) Estuary						
Aquatic Life	Aquatic Plants (Macrophytes)	4A	7.773			2006	2010
Shallow-Water Submerged Aquatic Vegetation	Aquatic Plants (Macrophytes)	4A	7.773			2006	2010
LAFMH-DO-BAY	Chesapeake Bay segment LAFMH (Lafayette River)						
Aquatic Life	Oxygen, Dissolved	4A	2.163			2006	2010
Open-Water Aquatic Life	Oxygen, Dissolved	4A	2.163			2006	2010
SBEMH-DO-BAY	Chesapeake Bay segment SBEMH (Southern Branch, Elizabeth River)						
Aquatic Life	Oxygen, Dissolved	4A	3.195			2006	2010
Deep-Water Aquatic Life	Oxygen, Dissolved	4A	2.446			2006	2010
Open-Water Aquatic Life	Oxygen, Dissolved	4A	3.195			2006	2010

VIRGINIA

Draft 305(b)/303(d)

WATER QUALITY INTEGRATED REPORT

to

CONGRESS and the EPA ADMINISTRATOR

for the

PERIOD

January 1, 2005 to December 31, 2010

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

DCR
Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL AND RECREATIONAL RESOURCES

Richmond, Virginia

March 2012

Planning Permit Review

Date: May 12, 2015
To: Kristie Britt, TRO Planning

Permit Writer: C. Thomas, TRO Water Permits
Facility: US – Norfolk Naval Shipyard
Permit Number: VA0005215
Issuance, Reissuance or Modification (if Modification describe): Regular reissuance
Permit Expiration Date: June 29, 2015 (to be administratively continued)
Waterbody ID (ex: VAT-G15E): VAT-G15E
Topo Name: Norfolk South (035D)
Facility Address: Norfolk Naval Shipyard,
Code 106, Building M-22, Portsmouth, Virginia 23709

Receiving Stream: Southern Branch, Elizabeth River

Stream Name:	Noted above.
Stream Data Requested?	Yes, T°C, salinity, pH, dissolved metals, DO, nutrients (N, P) - all those data for last 3 years- See Attachment 2.

Outfall Numbers	Refer to application package	**Lat/Long:**	Refer to application package

Planning Review:

303 (d): Indicate Outfalls which discharge directly to an impaired (Category 5) stream segment and parameters impaired	
All listed outfalls from application package discharge to Southern Branch of the Elizabeth River, impaired AU, VAT-G15E_SBE03A06. One outfall discharges to Paradise Creek impaired AU VAT-G15E_PAR01A06. Both of these segments are impaired for Aquatic Life Use -Dissolved Oxygen and Recreation Use - Enterococci with approved TMDLs. The Fish Consumption Use is impaired for TCDD and PCBs without a completed TMDL. See Attachment 1.	
Tier Determination	
Tier	**Tier 1 is maintained for both the Southern Branch of the Elizabeth and Paradise Creek. See Attachment 1.**
Tier	
Management Plan	
Is the facility Referenced in a Management Plan?	**No**
Are limits contained in a Management Plan?	**No**

Review will be completed in 30 days of receipt of request.

Additional Comments:

KNB 5/18/2015

SUMMARY OF AVAILABLE IN-STREAM CHEMICAL DATA
STATION 2-SBE001.98 - VA0005215

AQM STATION 2-SBE001.98

SAMPLING DATE	TEMP (°C)	pH (SU)	SALINITY (o/oo)	DO (mg/l)	NH3-N (mg/l)	NO2-N (mg/l)	NO3-N (mg/l)	NO2+NO3 (mg/l)	TOT N (mg/l)	TOT P (mg/l)
01/16/2013	8.6	7.8	18.4	10.3	0.081	0.002	0.063	0.066	0.454	0.012
02/20/2013	7.4	7.4	12.0	10.2	0.112	0.005	0.088	0.093	0.650	0.009
03/13/2013	8.8	7.5	15.3	10.1	0.089	0.005	0.058	0.063	0.505	0.011
04/10/2013	13.4	7.6	14.7	8.8	0.085	0.005	0.048	0.054	0.491	0.007
05/16/2013	20.5	7.3	15.7	6.5	0.218	0.016	0.130	0.146	0.728	0.028
06/12/2013	24.4	7.4	16.0	6.0	0.098	0.012	0.115	0.127	0.628	0.037
07/10/2013	27.3	7.6	21.6	5.7	0.109	0.013	0.071	0.084	0.443	0.038
08/08/2013	26.7	7.4	21.6	4.8	0.187	0.024	0.074	0.098	0.505	0.058
09/11/2013	26.7	7.4	20.8	5.1	0.045	0.110	0.045	0.155	0.611	0.068
10/30/2013	18.1	7.5	19.3	6.5	0.174	0.031	0.205	0.236	0.684	0.058
11/14/2013	13.9	7.5	20.9	7.8	0.179	0.016	0.220	0.236	0.655	0.055
12/12/2013	9.9	7.6	17.7	9.4	0.155	0.007	0.191	0.198	0.667	0.036
02/27/2014	6.5	7.2	15.0	7.4	0.260	0.004	0.059	0.063	0.716	0.022
03/12/2014	9.9	7.2	11.6	9.7	0.226	0.007	0.096	0.103	0.799	0.017
04/09/2014	12.9	7.2	13.3	8.7	0.156	0.007	0.081	0.088	0.648	0.012
05/14/2014	21.8	7.3	15.8	6.6	0.100	0.006	0.089	0.095	0.462	0.015
06/11/2014	24.3	7.4	17.7	5.0	0.196	0.014	0.125	0.139	0.659	0.036
07/09/2014	27.6	7.6	19.1	5.7	0.075	0.073	0.070	0.143	0.559	0.052
08/13/2014	26.8	7.3	19.2	4.0	0.012	0.234	0.117	0.350	0.646	0.073
09/10/2014	27.0	7.4	15.8	5.0	0.021	0.190	0.156	0.346	0.696	0.090
10/29/2014	18.3	7.7	20.2	7.1	0.091	0.009	0.164	0.172	0.554	0.048
12/11/2014	9.0	7.8	19.7	11.2	0.110	0.003	0.085	0.089	0.417	0.026
03/19/2015	7.9	8.1	16.0	12.3	0.005	0.002	0.002	0.002	0.470	0.007
MAXIMUM	27.6	8.1	12.3	21.6	0.260	0.234	0.220	0.350	0.799	0.090
MINIMUM	6.5	7.2	4.0	11.6	0.005	0.002	0.002	0.002	0.417	0.007
AVERAGE	17.3	7.5	7.5	17.3	0.121	0.035	0.102	0.137	0.593	0.035
COUNT	23	23	23	23	23	23	23	23	23	23
90^{th}%	27.0	7.8								

ATTACHMENT 11

TABLE III(a) AND TABLE III(b) - CHANGE SHEETS

ATTACHMENT 11
TABLE III(a) - VPDES PERMIT PROGRAM
Permit Processing Change Sheet

1. Effluent Limits and Monitoring Schedule: (List changes FROM PREVIOUS PERMIT, give rationale for changes).

OUTFALL NUMBER	PARAMETER CHANGED	MONITORING LIMITS CHANGED FROM / TO	EFFLUENT LIMITS CHANGED FROM / TO	RATIONALE	DATE & INITIAL
005, 024, 035, 047, 076-079, 079A, 101, & 300	OF designations	Point source discharges not present at facility now or during past reissuances. Review of facility plats did not reveal the presence of these outfalls. Application identified inactive outfall 300 w/101 removed via minor permit modification.		SEE ATTACHMENT 6	CDT 07/2015
015A, 015B, 042A, 044A, 044B, 045A, 080A-080D	OF designations	From: 015A, 015B, 042A, 044A, 044B, 045A, 080A-080D To: 104, 105, 106, 107, 108, 109, 110, 111, 112, 113	From: No change To: No change		
011	Flow, pH, TSS	From: 1/3 Months To: 1/6 Months	From: No limits, monitoring only To: No change		
	Dissolved copper and zinc	From: 1/3 Months To: 1/Year			
	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/6 Months for 2 years	From: Not in permit To: No limits, monitoring only		
025	Dissolved Zinc	From: 1/3 Months To: 1/Year	From: No limits, monitoring only To: No change		
	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/6 Months for 2 years	From: Not in permit To: No limits, monitoring only		
032	Dissolved copper	From: 1/6 Months To: 1/Year	From: No limits, monitoring only To: No change		
	Flow, pH, TSS, dissolved zinc	From: 1/6 Months To: 1/3 Months			
	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/6 Months for 2 years	From: Not in permit To: No limits, monitoring only		
	COD	From: 1/6 Months To: Remove from permit	From: No limits, monitoring only To: Remove from permit		
033	Flow, pH, TSS, dissolved copper	From: 1/6 Months To: 1/3 Months	From: No limits, monitoring only To: No change		

ATTACHMENT 11
TABLE III(a) - VPDES PERMIT PROGRAM
Permit Processing Change Sheet

1. Effluent Limits and Monitoring Schedule: (List changes FROM PREVIOUS PERMIT, give rationale for changes).

OUTFALL NUMBER	PARAMETER CHANGED	MONITORING LIMITS CHANGED FROM / TO	EFFLUENT LIMITS CHANGED FROM / TO	RATIONALE	DATE & INITIAL
033	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/6 Months for 2 years	From: Not in permit To: No limits, monitoring only	SEE ATTACHMENT 6	CDT 07/2015
	Dissolved zinc	From: Not in permit To: 1/Year			
036	Flow, pH, TSS, dissolved copper	From: 1/6 Months To: 1/3 Months	From: No limits, monitoring only To: No change		
	COD	From: 1/6 Months To: Remove from permit	From: No limits, monitoring only To: Remove from permit		
	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/6 Months for 2 years	From: Not in permit To: No limits, monitoring only		
	Dissolved zinc	From: Not in permit To: 1/Year			
040	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/Year for permit term	From: Not in permit To: No limits, monitoring only		
401	All metals' FEG limits	From: 2/Month To: No change	From: limits expressed as parts per billion (µg/l) To: limits expressed as parts per million (mg/l)		
940	Flow, pH, TSS, dissolved zinc & copper,	From: Not in permit To: 1/6 Months	From: Not in permit To: No limits, monitoring only		
	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/6 Months for 2 years			
072	Dissolved zinc	From: 1/3 Months To: 1/Year	From: No limits, monitoring only To: No change		
	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/6 Months for 2 years	From: Not in permit To: No limits, monitoring only		

ATTACHMENT 11
TABLE III(a) - VPDES PERMIT PROGRAM
Permit Processing Change Sheet

1. Effluent Limits and Monitoring Schedule: (List changes FROM PREVIOUS PERMIT, give rationale for changes).

OUTFALL NUMBER	PARAMETER CHANGED	MONITORING LIMITS CHANGED FROM / TO	EFFLUENT LIMITS CHANGED FROM / TO	RATIONALE	DATE & INITIAL
044	Flow, pH, TSS	From: 1/6 Months To: 1/3 Months	From: No limits, monitoring only To: No change	SEE ATTACHMENT 6	CDT 07/2015
	Dissolved copper	From: Not in permit To: 1/6 Months	From: Not in permit To: No limits, monitoring only		
	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/6 Months for 2 years			
956	Flow, pH, TSS, dissolved zinc & copper,	From: Not in permit To: 1/6 Months	From: Not in permit To: No limits, monitoring only		
	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/6 Months for 2 years			
082, 092, 094, 900 (100), 600	Flow, pH, TSS, dissolved zinc & copper,	From: Not in permit To: 1/6 Months	From: Not in permit To: No limits, monitoring only		
	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/6 Months for 2 years			
086	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/6 Months for 2 years	From: Not in permit To: No limits, monitoring only		
100	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/Year for permit term	From: Not in permit To: No limits, monitoring only		
103	Total copper & total zinc	From: 1/3 Months To: 2/Month	From: No limits, monitoring only To: No change		
	Dissolved copper & dissolved zinc	From: Not in permit To: 2/Month	From: Not in permit To: No limits, monitoring only		
200, 400, 500	Flow, pH, TRC, TSS	From: 1/3 Months To: 1/6 Months	From: Monitoring only, TRC limited To: No change		
	TN, TP, TKN, NO2+NO3	From: Not in permit To: 1/Year for permit term	From: Not in permit To: No limits, monitoring only		
501	Flow, pH, temp, TRC	From: 1/3 Months To: 1/Month	From: No limits, monitoring only To: No change		

ATTACHMENT 11
TABLE III(a) - VPDES PERMIT PROGRAM
Permit Processing Change Sheet

1. Effluent Limits and Monitoring Schedule: (List changes FROM PREVIOUS PERMIT, give rationale for changes).

OTHER CHANGES FROM:	CHANGED TO:	DATE & INITIAL
Part I.B. Schedule of Compliance - remove **Part I.C.** Whole Effluent Toxicity 401 - retain, relocate **Part I.D.** Other Requirements or Special Conditions 1. Permit Reopeners a. Water Quality Standards - retain b. Nutrient Enriched Waters - remove c. TMDL - retain 2. Licensed Operator - retain 3. O&M Manual - retain, revise 4. Notification Levels - retain 5. Sampling Methodology - retain, revise, relocate 6. New Discharges from EPA 2D - remove 7. Quantification Levels - retain, revise, relocate 8. Compliance Reporting - retain, revise, relocate 9. Industrial Activities and Process Wastewater - retain, revise, expand, relocate 10. Shipyard Best Management Practices - retain, relocate 11. Tributyltin - retain, relocate 12. Materials Handling & Storage - retain, relocate 13. Cooling Water & Boiler Discharges - retain, revise, expand, relocate 14. Water Quality Monitoring - retain, relocate **Part I.E.** Toxics Management Program - See Attachment 8 **Part I.F.** Storm Water Management Conditions - retain, revise, expand, relocate	**Part I.B.** Whole Effluent Toxicity 401 - retained, relocated **Part I.C.** Other Requirements or Special Conditions 1. Permit Reopeners a. Water Quality Standards - retained b. TMDL - retained 2. Licensed Operator - retained 3. O&M Manual - retained, revised 4. Notification Levels - retained 5. Quantification Levels - retained, revised, relocated, 6. Compliance Reporting - retained, revised, relocated, expanded (process WW nutrients) 7. Materials Handling & Storage - retained, relocated 8. Cooling Water & Boiler Discharges - retained, revised, expanded, relocated 9. Sampling Methodology & Outfall Specific Reqmts - retained, revised, relocated, expanded 10. Industrial Activities and Process Wastewater - retained, revised, expanded, relocated 11. Shipyard Best Management Practices - retained, relocated 12. Tributyltin - retained, relocated 13. Water Quality Monitoring - retained, relocated 14. Discharges to Surface Waters in the ChesBay Watershed - imposed per guidance 15. §316(b) BTA Cooling Water Intake Structures - imposed per guidance **Part I.D.** Toxics Management Program - See Attachment 8 **Part I.E.** Storm Water Management Conditions - retain expanded, relocated	CDT July, 2015

ATTACHMENT 12

NPDES INDUSTRIAL PERMIT RATING WORKSHEET

NPDES Permit Rating Work Sheet

___ Regular Addition
___ Discretionary Addition
___ Score change, but no status change
___ Deletion

NPDES No.: | V | A | 0 | 0 | 0 | 5 | 2 | 1 | 5 |

Facility Name:

| U | S | - | N | O | R | F | O | L | K | | N | A | V | A | L | | S | H | I | P | Y | A | R | D |

City: | P | O | R | T | S | M | O | U | T | H | , | | V | I | R | G | I | N | I | A |

Receiving Water: | S | O | U | T | H | E | R | N | | B | R | A | N | C | H | | E | L | I | Z | A | B | E | T | H | | R | I | V | E | R |

Reach Number: |___|___|___|___|___|___|___|___|___|___|___|

Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?

1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate

___ YES: score is 600 (stop here) X NO (continue)

Is this permit for a municipal separate storm sewer serving a population greater than 100,000?

___ YES; score is 700 (stop here)
X NO (continue)

FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: |___|___|___|___| Primary SIC Code: | 9 | 7 | 1 | 1 |

Other SIC Codes: | 3 | 7 | 3 | 1 | | 3 | 7 | 3 | 2 | |___|___|___|___| |___|___|___|___|

Industrial Subcategory Code: | 0 | 0 | 0 | (Code 000 if no subcategory)

Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
___ No process waste streams	0	0	___ 3.	3	15	___ 7.	7	35
___ 1.	1	5	___ 4.	4	20	___ 8.	8	40
___ 2.	2	10	___ 5.	5	25	X 9.	9	45
			___ 6.	6	30	___ 10.	10	50

Code Number Checked: | 0 | 9 |

Total Points Factor 1: | 4 | 5 |

FACTOR 2: Flow/Stream Flow Volume *(Complete Either Section A or Section B; check only one)*

Section A--Wastewater Flow Only Considered

Wastewater Type (See Instructions)			Code	Points
Type I:	Flow < 5 MGD	___	11	0
	Flow 5 to 10 MGD	___	12	10
	Flow > 10 to 50 MGD	___	13	20
	Flow > 50 MGD	___	14	30
Type II:	Flow < 1 MGD	___	21	10
	Flow 1 to 5 MGD	X	**22**	**20**
	Flow > 5 to 10 MGD	___	23	30
	Flow > 10 MGD	___	24	50
Type III:	Flow < 1 MGD	___	31	0
	Flow 1 to 5 MGD	___	32	10
	Flow > 5 to 10 MGD	___	33	20
	Flow > 10 MGD	___	34	30

Section B--Wastewater and Stream Flow Considered

Wastewater Type (See Instructions)	Percent of Instream Wastewater Concentration at Receiving Stream Low Flow		Code	Points
Type I/III:	< 10%	___	41	0
	> 10% to < 50%	___	42	10
	> 50%	___	43	20
Type II:	<10%	___	51	0
	> 10% to < 50%	___	52	20
	> 50%	___	53	30

Code Checked from Section A or B: | 2 | 2 |

Total Points Factor 2: | 2 | 0 |

NPDES No.: | V | A | 0 | 0 | 0 | 5 | 2 | 1 | 5 |

FACTOR 3: Conventional Pollutants

(only when limited by the permit)

A. Oxygen Demanding Pollutant: (check one) ___ BOD ___ COD _X_ Other: **NOT APPLICABLE**

Permit Limits: (check one)		*Code*	*Points*
	___ < 100 lbs/day	1	0
	___ 100 to 1000 lbs/day	2	5
	___ >1000 to 3000 lbs/day	3	15
	___ >3000 lbs/day	4	20

Code Checked: | - | - |

Points Scored: | 0 | 0 |

B. Total Suspended Solids (TSS)

Permit Limits: (check one)		*Code*	*Points*
	___ < 100 lbs/day	1	0
	_X_ 100 to 1000 lbs/day	2	5
	___ >1000 to 5000 lbs/day	3	15
	___ >5000 lbs/day	4	20

Code Checked: | 0 | 2 |

Points Scored: | 0 | 5 |

C. Nitrogen Pollutant: (check one) ___ Ammonia _X_ Other: **NOT APPLICABLE**

Permit Limits: (check one)		*Code*	*Points*
	___ < 300 lbs/day	1	0
	___ 300 to 1000 lbs/day	2	5
	___ >1000 to 3000 lbs/day	3	15
	___ >3000 lbs/day	4	20

Code Checked: | - | - |

Points Scored: | 0 | 0 |

Total Points Factor 3: | 0 | 5 |

FACTOR 4: Public Health Impact

Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.

___ YES (if yes, check toxicity potential number below)
_X_ **NO (if no, go to Factor 5)**

Determine the human health toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column -- check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
___ No process waste streams	0	0	___ 3.	3	0	___ 7.	7	15
___ 1.	1	0	___ 4.	4	0	___ 8.	8	20
___ 2.	2	0	___ 5.	5	5	___ 9.	9	25
			___ 6.	6	10	___ 10.	10	30

Code Number Checked: | - | - |

Total Points Factor 4: | 0 | 0 |

NPDES No.: | V | A | 0 | 0 | 0 | 5 | 2 | 1 | 5 |

FACTOR 5: Water Quality Factors

A. *Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge?*

		Code	Points
X	Yes	1	10
___	No	2	0

B. *Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?*

		Code	Points
X	Yes	1	0
___	No	2	5

C. *Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?*

		Code	Points
___	Yes	1	10
X	No	2	0

Code Number Checked: A | 1 | B | 1 | C | 2 |

Points Factor 5: A | 1 | 0 | + B | 0 | + C | 0 | 0 | = | 1 | 0 | TOTAL

FACTOR 6: Proximity to Near Coastal Waters

A. *Base Score: Enter flow code here (from Factor 2):* | 5 | 1 | *Enter the multiplication factor that corresponds to the flow code:* | 0 | . | 1 |

Check appropriate facility HPRI Code (from PCS):

	HPRI #	*Code*	*HPRI Score*	Flow Code	Multiplication Factor
___	1	1	20	11, 31, or 41	0.00
				12, 32, or 42	0.05
___	2	2	0	13, 33, or 43	0.10
				14 or 34	0.15
X	**3**	**3**	**30**	21 or 51	0.10
				22 or 52	**0.30**
___	4	4	0	23 or 53	0.60
				24	1.00
___	5	5	20		

HPRI code checked: | 3 |

Base Score: (HPRI Score) 30 X (Multiplication Factor) 0.3 = 9.0 (TOTAL POINTS)

B. <u>Additional Points</u> -- *NEP Program*
For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?

		Code	Points
X	Yes	1	10
___	No	2	0

C. <u>Additional Points</u> -- *Great Lakes Area of Concern for a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see instructions)*

		Code	Points
___	Yes	1	10
X	**No**	**2**	**0**

Code Number Checked: A | 3 | B | 1 | C | 2 |

Points Factor 6: A | 0 | 9 | + B | 1 | 0 | + C | 0 | 0 | = | 19 | TOTAL

NPDES Permit Rating Work Sheet

NPDES No.: | V | A | 0 | 0 | 0 | 5 | 2 | 1 | 5 |

SCORE SUMMARY

Factor	Description	Total Points
1	Toxic Pollutant Potential	45
2	Flow/Stream flow Volume	20
3	Conventional Pollutants	05
4	Public Health Impacts	00
5	Water Quality Factors	10
6	Proximity to Near Coastal Waters	19
	TOTAL (Factors 1-6)	99

S1. Is the total score equal to or greater than 80? X Yes (Facility is a major) X No

S2. If the answer to the above question is no, would you like this facility to be discretionary major?

- No
- Yes (add 500 points to the above score and provide reason below:

Reason:

NEW SCORE: 99

OLD SCORE: 99

Carl D. Thomas
Permit Reviewer's Name

(757) 518-2161
Phone Number

June 17, 2015
Date

ATTACHMENT 13

CHRONOLOGY SHEET

Description for 9711: National Security

Division J: Public Administration | Major Group 97: National Security And International Affairs

Industry Group 971: National Security

9711 National Security
Establishments of the armed forces, including the National Guard, primarily engaged in national security and related activities. Establishments primarily engaged in manufacturing ordnance, ships and other military goods are classified in Manufacturing, Division D. Service academies are classified in Services, Industry 8221, but military training schools are classified here. Military hospitals are classified in Services, Industry Group 806. Establishments of the Coast Guard primarily engaged in the administration, operation, or regulation of transportation are classified in Industry 9621.

- Air Force
- Army
- Marine Corps
- Military training schools
- National Guard
- Navy

SIC Search | Division Structure | Major Group Structure

Description for 3731: Ship Building and Repairing

Division D: Manufacturing | Major Group 37: Transportation Equipment

Industry Group 373: Ship And Boat Building And Repairing

3731 Ship Building and Repairing
Establishments primarily engaged in building and repairing ships, barges, and lighters, whether self-propelled or towed by other craft. This industry also includes the conversion and alteration of ships and the manufacture of off-shore oil and gas well drilling and production platforms (whether or not self-propelled). Establishments primarily engaged in fabricating structural assemblies or components for ships, or subcontractors engaged in ship painting, joinery, carpentry work, and electrical wiring installation, are classified in other industries.

- Barges, building and repairing
- Cargo vessels, building and repairing
- Combat ships, building and repairing
- Crew boats, building and repairing
- Dredges, building and repairing
- Drilling and production platforms, floating, oil and gas
- Drydocks, floating
- Ferryboats, building and repairing
- Fireboats, building and repairing
- Fishing vessels, large: seiners and trawlers-building and repairing
- Hydrofoil vessels
- Landing ships, building and repairing
- Lighters, marine: building and repairing
- Lighthouse tenders, building and repairing
- Marine rigging
- Naval ships, building and repairing
- Offshore supply boats, building and repairing
- Passenger-cargo vessels, building and repairing
- Patrol boats, building and repairing
- Radar towers, floating
- Sailing vessels, commercial: building and repairing
- Scows, building and repairing
- Seiners, building and repairing
- Shipbuilding and repairing
- Submarine tenders, building and repairing
- Tankers (ships), building and repairing
- Tenders (ships), building and repairing
- Towboats, building and repairing
- Transport vessels, passenger and troop: building and repairing
- Trawlers, building and repairing
- Tugboats, building and repairing

SIC Search | Division Structure | Major Group Structure

Telephone: 800-321-OSHA (6742) | TTY
www.OSHA.gov

Description for 3732: Boat Building and Repairing

Division D: Manufacturing | Major Group 37: Transportation Equipment

Industry Group 373: Ship And Boat Building And Repairing

3732 Boat Building and Repairing
Establishments primarily engaged in building and repairing boats. Establishments primarily engaged in manufacturing rubber and nonrigid plastics boats are classified in Major Group 30. Establishments primarily engaged in operating marinas and which perform incidental boat repair are classified in Transportation, Industry 4493; membership yacht clubs are classified in Services, Industry 7997; and those performing outboard motor repair are classified in Services, Industry 7699.

- Boat kits, not a model
- Boats, fiberglass: building and repairing
- Boats, rigid: plastics
- Boats: motorboats, sailboats, rowboats, and canoes-building and
- Canoes, building and repairing
- Dinghies, building and repairing
- Dories, building and repairing
- Fishing boats, small
- Houseboats, building and repairing
- Hydrofoil boats
- Kayaks, building and repairing
- Life boats, building and repairing
- Life rafts, except inflatable (rubber and plastics)
- Motorboats, inboard and outboard: building and repairing
- Pontoons, except aircraft and inflatable (rubber and plastics)
- Skiffs, building and repairing

SIC Search | Division Structure | Major Group Structure

Description for 3471: Electroplating, Plating, Polishing, Anodizing, and Coloring

Division D: Manufacturing | Major Group 34: Fabricated Metal Products, Except Machinery And Transportation Equipment

Industry Group 347: Coating, Engraving, And Allied Services

3471 Electroplating, Plating, Polishing, Anodizing, and Coloring
Establishments primarily engaged in all types of electroplating, plating, anodizing, coloring, and finishing of metals and formed products for the trade. Also included in this industry are establishments which perform these types of activities, on their own account, on purchased metals or formed products. Establishments that both manufacture and finish products are classified according to the products.

- Anodizing of metals and formed products, for the trade
- Buffing, for the trade
- Chromium plating of metals and formed products, for the trade
- Cleaning and descaling metal products, for the trade
- Coloring and finishing of aluminum and formed products, for the
- Decontaminating and cleaning of missile and satellite parts, for the
- Decorative plating and finishing of formed products, for the trade
- Depolishing metal, for the trade
- Electrolizing steel, for the trade
- Electroplating of metals and formed products, for the trade
- Finishing metal products and formed products, for the trade
- Gold plating, for the trade
- Plating of metals and formed products for the trade
- Polishing of metals and formed products, for the trade
- Rechroming auto bumpers, for the trade
- Sandblasting of metal parts, for the trade
- Tumbling (cleaning and polishing) of machine parts, for the trade

SIC Search | Division Structure | Major Group Structure

Description for 4499: Water Transportation Services, Not Elsewhere Classified

Division E: Transportation, Communications, Electric, Gas, And Sanitary Services | Major Group 44: Water Transportation

Industry Group 449: Services Incidental To Water Transportation

4499 Water Transportation Services, Not Elsewhere Classified
Establishments primarily engaged in furnishing miscellaneous services incidental to water transportation, not elsewhere classified, such as lighterage, boat hiring, except for pleasure; chartering of vessels; canal operation; ship cleaning, except hold cleaning; and steamship leasing. Establishments primarily engaged in ship hold cleaning are classified in Industry 4491; and those primarily engaged in the operation of charter or party fishing boats or rental of small recreational boats are classified in Services, Industry 7999.

- Boat cleaning
- Boat hiring, except pleasure
- Boat livery, except pleasure
- Boat rental, commercial
- Canal operation
- Cargo salvaging, from distressed vessels
- Chartering of commercial boats
- Dismantling ships
- Lighterage
- Marine railways for drydocking, operation of
- Marine salvaging
- Marine surveyors, except cargo
- Marine wrecking: ships for scrap
- Piloting vessels in and out of harbors
- Ship cleaning, except hold cleaning
- Ship registers: survey and classification of ships and marine
- Steamship leasing

SIC Search Division Structure Major Group Structure

Description for 5093: Scrap and Waste Materials

Division F: Wholesale Trade | Major Group 50: Wholesale Trade-durable Goods

Industry Group 509: Miscellaneous Durable Goods

5093 Scrap and Waste Materials
Establishments primarily engaged in assembling, breaking up, sorting, and wholesale distribution of scrap and waste materials. This industry includes auto wreckers engaged in dismantling automobiles for scrap. However, those engaged in dismantling cars for the purpose of selling secondhand parts are classified in Industry 5015.

- Automotive wrecking for scrap-wholesale Bag
- Bottles, waste-wholesale
- Boxes, waste-wholesale
- Fur cuttings and scraps-wholesale
- Iron and steel scrap-wholesale
- Junk and scrap, general line-wholesale
- Metal waste and scrap-wholesale
- Nonferrous metals scrap-wholesale
- Oil, waste-wholesale
- Plastics scrap-wholesale
- Rags-wholesale
- Rubber scrap-wholesale
- Scavengering-wholesale
- Scrap and waste materials-wholesale
- Textile waste-wholesale
- Wastepaper, including paper recycling-wholesale
- Wiping rags, including washing and reconditioning-wholesale

SIC Search Division Structure Major Group Structure

Description for 4952: Sewerage Systems

Division E: Transportation, Communications, Electric, Gas, And Sanitary Services | Major Group 49: Electric, Gas, And Sanitary Services

Industry Group 495: Sanitary Services

4952 Sewerage Systems
Establishments primarily engaged in the collection and disposal of wastes conducted through a sewer system, including such treatment processes as may be provided.

- Sewerage systems

SIC Search | Division Structure | Major Group Structure

Description for 7389: Business Services, Not Elsewhere Classified

Division I: Services | Major Group 73: Business Services

Industry Group 738: Miscellaneous Business Services

7389 Business Services, Not Elsewhere Classified
Establishments primarily engaged in furnishing business services, not elsewhere classified, such as bondspersons, drafting services, lecture bureaus, notaries public, sign painting, speakers' bureaus, water softening services, and auctioneering services, on a commission or fee basis. Auctions of used cars and agricultural commodities, such as livestock and produce, are classified in Wholesale Trade.

- Agents and brokers for authors and nonperforming artist
- Apparel pressing service for the trade
- Appraisers, except real estate appraisers
- Arbitration and conciliation services
- Artists' agents and brokers, except performing artists
- Auctioneering service on a commission or fee basis
- Authors' agents and brokers
- Automobile recovery service
- Automobile repossession service
- Automobile shows, flower shows, and home shows: promoters of
- Bartering services for businesses
- Batik work (handprinting on textiles)
- Bondspersons
- Bottle exchanges
- Bronzing baby shoes
- Business brokers (buying and selling business enterprises)
- Charge account service (shopping plates) collection by individual
- Check validation service
- Cloth: cutting to length, bolting, or winding for textile distributors
- Contractors' disbursement control
- Convention bureaus
- Convention decorators
- Copyright protection service
- Correct time service
- Cosmetic kits, assembling and packaging
- Cotton inspection service, not connected with transportation
- Cotton sampler service
- Coupon redemption service, except trading stamps
- Credit card service (collection by individual firms)
- Decoration service for special events
- Demonstration service, separate from sale
- Directories, telephone: distribution on a contract or fee basis
- Divers, commercial
- Drafting service, except temporary help
- Drawback service, customs
- Drive-a-way automobile service
- Embroidering of advertising on shirts, etc.
- Engrossing, e.g., diplomas and resolutions
- Exhibits, building of: by industrial contractors

- Filling pressure containers (aerosol) with hair spray, insecticides, etc.
- Fire extinguishers, service of
- Firefighting service, other than forestry or public
- Flagging service (traffic control)
- Floats, decoration of
- Florists' telegraph service
- Folding and refolding service: textile and apparel
- Fundraising on a contract or fee basis
- Gas systems, contract conversion from manufactured to natural gas
- Handtool designers
- Handwriting analysis
- Hosiery pairing on a contract or fee basis
- Hotel reservation service
- Identification engraving service
- Inspection of commodities, not connected with transportation
- Interior decorating consulting service, except painters and paper
- Interior designing service, except painters and paper hangers
- Inventory computing service
- Labeling bottles, cans, cartons, etc. for the trade: not printing
- Laminating of photographs (coating photographs with plastics)
- Lecture bureaus
- Lettering service
- Liquidators of merchandise on a contract or fee basis
- Mannequin decorating service
- Map drafting service
- Mapmaking, including aerial
- Message service, telephone answering except beeper service
- Metal slitting and shearing on a contract or fee basis
- Meter readers, remote
- Microfilm recording and developing service
- Mounting merchandise on cards on a contract or fee basis
- Music distribution systems, except coin-operated
- Notaries public
- Packaging and labeling service (not packing and crating)
- Paralegal service
- Parcel packing service (packaging)
- Patent brokers
- Patrol of electric transmission or gas lines
- Photogrammetric mapping service (not professional engineers)
- Photographic library service, still
- Photography brokers
- Pipeline and power line inspection services
- Playwrights' brokers
- Post office contract stations
- Presorting mail service
- Press clipping service
- Printed circuitry graphic layout
- Process serving service
- Produce weighing service, not connected with transportation
- Product sterilization service
- Promoters of home shows and flower shows
- Racetrack cleaning, except buildings
- Radio broadcasting music checkers
- Radio transcription service
- Recording studios on a contract or fee basis
- Redemption of trading stamps
- Repossession service
- Restaurant reservation service
- Rug binding for the trade
- Safety inspection service, except automotive

- Scrap steel cutting on a contract or fee basis
- Shoe designers
- Showcard painting
- Shrinking textiles for tailors and dressmakers
- Sign painting and lettering shops
- Solvents recovery service on a contract or fee basis
- Speakers' bureaus
- Sponging textiles for tailors and dressmakers
- Styling of fashions, apparel, furniture, and textiles
- Styling wigs for the trade
- Swimming pool cleaning and maintenance
- Switchboard operation of private branch exchanges
- Tape slitting for the trade (cutting plastics, leather, etc. into widths)
- Tax collection agencies: collecting for a city, county, or State
- Tax title dealers: agencies for city, county, or State
- Telemarketing (telephone marketing) service on a contract or fee basis
- Telephone answering, except beeper service
- Telephone solicitation service on a contract or fee basis
- Textile designers
- Textile folding and packing services
- Time-share condominium exchanges
- Tobacco sheeting service on a contract or fee basis
- Tourist information bureaus
- Trade show arrangement
- Trading stamp promotion and sale to stores
- Trading stamp redemption
- Translation service
- Water softener service
- Weighing foods and other commodities not connected with
- Welcoming service
- Window trimming service
- Yacht brokers

SIC Search Division Structure Major Group Structure

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
TIDEWATER REGIONAL OFFICE
5636 Southern Boulevard, Virginia Beach, Virginia 23462
(757) 518-2000 Fax (757) 518-2009
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Maria R. Nold
Regional Director

June 10, 2015

Mr. John M. Briganti
Director, Environmental Division
Norfolk Naval Shipyard
Code 106
Portsmouth, Virginia 23709-1035

Re: Reissuance of VPDES Permit Number VA0005215
US – Norfolk Naval Shipyard, Portsmouth, Virginia

Dear Mr. Briganti:

The purpose of this letter is to inform you that the processing of the subject VPDES permit will continue past the scheduled expiration date of the current permit. The Command's current VPDES permit will expire June 29, 2015.

In accordance with 9VAC25-31-70 of the VPDES Permit Regulation, the Department will administratively continue the current permit until the permit under development is formally reissued. This action is based on your staff preparing a complete application package and submitting the required materials in a timely manner, to the Tidewater Regional Office.

Until the permit under development is reissued, the current permit remains fully effective and enforceable. In this regard, please continue all effluent sampling and file any reports required by the current permit in a timely and complete manner.

Thank you and your staff for preparing and submitting the complete application package. If you have any questions about our procedures or the status of your draft permit, please feel free to call me at (757) 518-2161, or by e-mail carl.thomas@deq.virginia.gov.

Sincerely,

Carl D. Thomas
Environmental Specialist, Senior

Cc: DEQ – TRO/file (VA0005215@ECM)
EPA Region III

Thomas, Carl (DEQ)

From: Johnson, Ernest (VDH)
Sent: Thursday, September 17, 2015 11:42 AM
To: Thomas, Carl (DEQ)
Cc: Horne, Daniel (VDH)
Subject: RE: Reissuance of VPDES Permit Number VA0005215 - US Norfolk Naval Shipyard, Portsmouth Virginia
Attachments: NNSY VPDES.pdf

Carl –

I apologize for the delay getting back to you on this. The VDH response is dated on May 26, 2015. It's possible that the letter was misdirected when mailed.

A copy of the May 26, 2015 response is attached. There are no impacts to Waterworks in Virginia.

Thanks,
Ernie

Ernest G. Johnson, Jr., PE, District Engineer
Virginia Dept. of Health - Office of Drinking Water
Southeast Virginia Field Office
830 Southampton Ave., Suite 2058
Norfolk, VA 23510
Ph.: (757) 683-2000, ext. 112
Fax: (757) 683-2007
E-Mail: Ernest.Johnson@vdh.virginia.gov
ODW Website: Drinking Water

From: Thomas, Carl (DEQ)
Sent: Thursday, September 17, 2015 11:32 AM
To: Horne, Daniel (VDH); Johnson, Ernest (VDH)
Subject: FW: Reissuance of VPDES Permit Number VA0005215 - US Norfolk Naval Shipyard, Portsmouth Virginia

Good Morning,

Request advise status of response to attached inquiry pertaining to review of subject VPDES permit application.

Thanks.

carl.thomas@deq.virginia.gov

757.518.2161

COMMONWEALTH of VIRGINIA

Marissa J. Levine, MD, MPH, FAAFP
State Health Commissioner

John J. Aulbach II, PE
Director, Office of Drinking Water

DEPARTMENT OF HEALTH
OFFICE OF DRINKING WATER
Southeast Virginia Field Office

830 Southampton Avenue
Suite 2058
Norfolk, VA 23510
Phone (757) 683-2000
Fax (757) 683-2007

DATE: MAY 2 6 2015

FROM: DBH Daniel B. Horne, PE
Engineering Field Director

TO: Mr. Carl D. Thomas
Environmental Specialist, Senior
DEQ Tidewater Regional Office
5636 Southern Boulevard
Virginia Beach, Virginia 23462

CITY/COUNTY: City of Portsmouth
APPLICANT: Mr. J.G. Asplaugh, Director of Occupational, Safety, Health and Environment Office, U.S. Navy, Norfolk Naval Shipyard
PERMIT TYPE: VPDES
APPLICATION TYPE: Re-Issuance (Existing)
PROJECT: Norfolk Naval Shipyard
SUBJECT: Review response for DEQ's permit application # VA0005215

Our office has reviewed the application for discharges associated with shipbuilding and repair.

No public raw water intakes in Virginia were found downstream or upstream from the discharge area.

cc: VDH, ODW – Central Office
City of Portsmouth Health Department
Mr. J. G. Asplaugh, Director of Occupational, Safety, Health and Environment Office,
U.S. Navy, Norfolk Naval Shipyard

R:\DIST20A\Portsmouth\VPDES\NNSY VPDES may15.docx

COMMONWEALTH of VIRGINIA

Department of Health
DIVISION OF SHELLFISH SANITATION

109 Governor Street, Room 614-B
Richmond, VA 23219

Ph: 804-864-7487
Fax: 804-864-7481

MEMORANDUM

DATE: 5/21/2015

TO: Carl D. Thomas
Department of Environmental Quality

FROM: B. Keith Skiles, MPH, Director
Division of Shellfish Sanitation

SUBJECT: US - Norfolk Naval Shipyard

City / County: City of Portsmouth

Waterbody: Elizabeth River

Type: ☑ VPDES ☐ VMRC ☐ VPA ☐ VWP ☐ JPA ☐ Other:

Application / Permit Number: VA0005215

☐ The project will not affect shellfish growing waters.

☐ The project is located in or adjacent to approved shellfish growing waters, however, the activity as described will not require a change in classification.

☑ The project is located in or adjacent to condemned shellfish growing waters and the activity, as described, will not cause an increase in the size or type of the existing closure.

☐ The project will affect condemned shellfish waters and will not cause an increase in the size of the total condemnation. However, a prohibited area (an area from which shellfish relay to approved waters for self-purification is not allowed) will be required within a portion of the currently condemned area. See comments.

☐ A buffer zone (including a prohibited area) has been previously established in the vicinity of this discharge, however, the closure will have to be revised. Map attached.

☐ This project will affect approved shellfish waters. If this discharge is approved, a buffer zone (including a prohibited area) will be established in the vicinity of the discharge. Map attached.

☐ Other.

ADDITIONAL COMMENTS:

Area #: 65

eta

Archived: Thursday, May 21, 2015 4:24:20 PM
From: Aschenbach, Eric (VDH)
Sent: Thursday, May 21, 2015 4:19:28 PM
To: Thomas, Carl (DEQ)
Cc: Stagg, Ben (MRC); Howell, Beth (MRC); Horne, Daniel (VDH)
Subject: RE: Reissuance of VPDES Permit Number VA0005215 - US Norfolk Naval Shipyard, Portsmouth Virginia
Importance: Normal
Attachments: VA0005215_VDH_ResponseMemo-20150521.pdf ;

Carl and others,

It does not appear that this permit action will cause a change to the existing status/closure of shellfish waters.

Eric

Eric T. Aschenbach

Shellfish Growing Area Manager

Virginia Department of Health

Office of Environmental Health Services

Division of Shellfish Sanitation

109 Governor Street, 6th Floor

Richmond, VA 23219

eric.aschenbach@vdh.virginia.gov

Phone: (804) 864-7479

Fax: (804) 864-7481

From: Thomas, Carl (DEQ)
Sent: Tuesday, May 12, 2015 2:38 PM
To: Horne, Daniel (VDH)
Cc: Stagg, Ben (MRC); Aschenbach, Eric (VDH); Howell, Beth (MRC)
Subject: RE: Reissuance of VPDES Permit Number VA0005215 - US Norfolk Naval Shipyard, Portsmouth Virginia

Good Afternoon,

Per mailing from Mr. Horne a few minutes ago, the information provided at the link below was altered from a .msg format to .pdf, and should now be viewable by all for your purposes.

http://www.deq.virginia.gov/fileshare/wps/PERMIT/TRO/VDH,%20DSS,%20VMRC%20For%20Review/VA0005215%202015-2020%20US%20NORF%20NAV%20SHIPYARD/

Apologies offered for the format foul-up.

Thanks.

carl.thomas@deq.virginia.gov

757.518.2161

From: Horne, Daniel (VDH)
Sent: Tuesday, May 12, 2015 2:21 PM
To: Thomas, Carl (DEQ)
Subject: RE: Reissuance of VPDES Permit Number VA0005215 - US Norfolk Naval

Shipyard, Portsmouth Virginia

Carl –

I have printed off some of the materials. I went to look at other materials, but when I click on the link, I get a "Error 404 – Page not found" message. This was for all of the 2 F forms – they all have a .msg ending on the document, rather than a pdf ending. I don't know that they're really needed for ODW purposes, but they might be needed for either Shellfish or MRC.

Dan H.

From: Thomas, Carl (DEQ)
Sent: Tuesday, May 12, 2015 1:36 PM
To: Horne, Daniel (VDH); Stagg, Ben (MRC); Howell, Beth (MRC); Aschenbach, Eric (VDH)
Subject: Reissuance of VPDES Permit Number VA0005215 - US Norfolk Naval Shipyard, Portsmouth Virginia

Good Afternoon,

Please find below, the link that will take all you all to the site where the subject permit application materials can be found, in addition to letters to each of your organizations requesting a review of the materials provided.

Naval Shipyard's sanitary WW are connected to the HRSD as well as those of vessels moored to that location for services provided.

http://www.deq.virginia.gov/fileshare/wps/PERMIT/TRO/VDH,%20DSS,%20VMRC%20For%20Review/VA0005215%202015-2020%20US%20NORF%20NAV%20SHIPYARD/

If there are any questions, or if additional information is necessary, please contact this office for resolution.

Thanks.

carl.thomas@deq.virginia.gov

757.518.2161

Thomas, Carl (DEQ)

From: Horne, Daniel (VDH)
Sent: Tuesday, May 12, 2015 3:28 PM
To: Thomas, Carl (DEQ)
Subject: RE: Reissuance of VPDES Permit Number VA0005215 - US Norfolk Naval Shipyard, Portsmouth Virginia

Carl –

The project has been assigned to Ernie Johnson for review and preparation of the ODW response.

Dan H.

From: Thomas, Carl (DEQ)
Sent: Tuesday, May 12, 2015 2:38 PM
To: Horne, Daniel (VDH)
Cc: Stagg, Ben (MRC); Aschenbach, Eric (VDH); Howell, Beth (MRC)
Subject: RE: Reissuance of VPDES Permit Number VA0005215 - US Norfolk Naval Shipyard, Portsmouth Virginia

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Apologies offered for the format foul-up.

Thanks.

carl.thomas@deq.virginia.gov

757.518.2161

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Sent: Tuesday, May 12, 2015 2:21 PM
To: Thomas, Carl (DEQ)
Subject: RE: Reissuance of VPDES Permit Number VA0005215 - US Norfolk Naval Shipyard, Portsmouth Virginia

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To: Horne, Daniel (VDH); Stagg, Ben (MRC); Howell, Beth (MRC); Aschenbach, Eric (VDH)
Subject: Reissuance of VPDES Permit Number VA0005215 - US Norfolk Naval Shipyard, Portsmouth Virginia

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http://www.deq.virginia.gov/fileshare/wps/PERMIT/TRO/VDH,%20DSS,%20VMRC%20For%20Review/VA0005215%202015-2020%20US%20NORF%20NAV%20SHIPYARD/

If there are any questions, or if additional information is necessary, please contact this office for resolution.

Thanks.

carl.thomas@deq.virginia.gov

757.518.2161

Thomas, Carl (DEQ)

From: Thomas, Carl (DEQ)
Sent: Tuesday, May 12, 2015 1:36 PM
To: Horne, Daniel (VDH); Stagg, Ben (MRC); Howell, Beth (MRC); Aschenbach, Eric (VDH)
Subject: Reissuance of VPDES Permit Number VA0005215 - US Norfolk Naval Shipyard, Portsmouth Virginia

Good Afternoon,

Please find below, the link that will take all you all to the site where the subject permit application materials can be found, in addition to letters to each of your organizations requesting a review of the materials provided.

Naval Shipyard's sanitary WW are connected to the HRSD as well as those of vessels moored to that location for services provided.

http://www.deq.virginia.gov/fileshare/wps/PERMIT/TRO/VDH,%20DSS,%20VMRC%20For%20Review/VA0005215%202015-2020%20US%20NORF%20NAV%20SHIPYARD/

If there are any questions, or if additional information is necessary, please contact this office for resolution.

Thanks.

carl.thomas@deq.virginia.gov

757.518.2161

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
TIDEWATER REGIONAL OFFICE
5636 Southern Boulevard, Virginia Beach, Virginia 23462
(757) 518-2000 Fax (757) 518-2009
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Maria R. Nold
Regional Director

May 12, 2015

Virginia Marine Resources Commission
2600 Washington Avenue, 3rd Floor
Newport News, Virginia 23607

Re: Reissuance of VPDES Permit Number VA0005215
US – Norfolk Naval Shipyard
Portsmouth, Virginia

Dear Sir or Madam:

Enclosed for your review is a copy of a VPDES permit application for a proposed discharge of pollutants from a point source to state waters adjacent to, or in near proximity to, shellfish growing areas. A copy of this application has also been sent to the Virginia Department of Health Division of Shellfish Sanitation (DSS), and DSS has been requested to copy VMRC on correspondence relative to this application.

Please review the application and DSS correspondence. If DSS notifies you that no condemnation of shellfish growing areas would be necessary as a result of the proposed discharge, then VMRC is not required to take any further action.

If DSS indicates in its correspondence that shellfish growing areas will have to be condemned (i.e., reclassified as restricted or prohibited as defined by the National Shellfish Sanitation Program) as a result of the proposed discharge, please fill out the attached certification form and send it to DEQ within 21 days of receipt of the DSS comments.

Alternatively, VMRC may respond to DEQ that more information is needed and that VMRC either intends to or does not intend to perform a field evaluation. If VMRC notifies DEQ that more information is needed and that it intends to perform a field evaluation, VMRC agrees to certify to DEQ within 30 calendar days after receipt of the notice that the condemnation will or will not have an effect on shellfish use now and in the foreseeable future. If VMRC certifies to DEQ that more information is needed and that it does not intend to perform a field evaluation, DEQ will contact the permit applicant to allow the applicant the option of obtaining a field evaluation of the areas proposed for condemnation. If VMRC receives a field evaluation from the applicant, please review the evaluation and fill out the attached certification form and send it to DEQ within 21 days of receipt of the evaluation.

These deadlines are specified in an agreement between the Director of DEQ and the Commissioner of VMRC to ensure that DEQ can process the permit in a timely manner. If you have any questions, please do not hesitate to contact me by telephone at (757) 518 – 2161 or by e-mail at carl.thomas@deq.virginia.gov .

Sincerely,

Carl D. Thomas
Environmental Specialist, Senior

Enclosure: Certification Form
Permit Application (via .ftp site)

cc: DEQ – TRO/file (VA0005215@ECM)
DSS (via .ftp site)

Virginia Marine Resources Commission
Evaluation and Certification on the Effects of Proposed Shellfish Condemnation
VPDES Permit Number:
Facility Name:
Facility Location:
Description of the designated area:

Presence or Absence of Shellfish; Identification of Species; Results of Survey:

Commercial Harvest Rates:

Private Oyster Ground Leases/Public Ground Designations:

Physical Parameters:

In accordance with 9 VAC 25-260-270, MRC has reviewed the above information for the VPDES application referenced above, and DSS information on shellfish growing areas that will be condemned (i.e. reclassified as restricted or prohibited as defined by the National Shellfish Sanitation Program) if the VPDES permit is issued for this discharge, and concludes the proposed condemnation will have the following effects on the shellfish use now and in the foreseeable future:

Signed: _____

Title: _____

Date: _____

This certification is intended to provide factual information to DEQ required by 9 VAC 25-260-270. This is not a final determination or case decision under the Virginia Administrative Process Act applicable to the above-mentioned facility or VPDES permit application. The final decision to issue or deny the VPDES permit application is within the discretion of the State Water Control Board.

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
TIDEWATER REGIONAL OFFICE
5636 Southern Boulevard, Virginia Beach, Virginia 23462
(757) 518-2000 Fax (757) 518-2009
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Maria R. Nold
Regional Director

May 12, 2015

Division of Shellfish Sanitation
Virginia Department of Health
109 Governor Street, Room 614B
Richmond, Virginia 23219

Re: Reissuance of VPDES Permit Number VA0005215
US – Norfolk Naval Shipyard
Portsmouth, Virginia

Dear Sir:

Enclosed is a copy of a VPDES permit application for your review. A copy has also been sent to the Virginia Marine Resources Commission (VMRC). Please review this application and provide your comments within 14 calendar days to DEQ identifying the location of any shellfish growing areas that would have to be condemned pursuant to Va. Code §28.2-807 (e.g., reclassified as restricted or prohibited as defined by the National Shellfish Sanitation Program) as a result of the proposed discharge of pollutants described in the application.

Alternatively, you may respond to DEQ within 14 calendar days of receipt of the application that DSS intends to conduct a further evaluation of the proposed discharge site. If DSS intends to conduct a further evaluation, please provide your comments to DEQ within 30 calendar days after receipt of the application.

In the event that DSS anticipates that, due to the complexity of a proposal or the scope of an evaluation, please, within 14 days of receipt, inform DEQ of the anticipated time required to further evaluate the application. These deadlines are specified in the agreement between the Director of DEQ and the Commissioner of the Virginia Department of Health to ensure that DEQ can process the permit in a timely manner.

Please provide a copy of any correspondence relative to this application to VMRC at the following address:

VMRC
2600 Washington Avenue, 3^{d} Floor
Newport News, Virginia 23607

The courtesy of a reply is hereby requested.

If there are any questions or if we can be of further assistance, please feel free to contact this office (757) 518-2161, or by e-mail carl.thomas@deq.virginia.gov.

Sincerely,

Carl D. Thomas
Environmental Specialist, Senior

cc: DEQ - TRO/file (VA0005215@ECM)
Enclosure: Permit Application (via agreed upon .ftp site)

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
TIDEWATER REGIONAL OFFICE
5636 Southern Boulevard, Virginia Beach, Virginia 23462
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Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Maria R. Nold
Regional Director

May 12, 2015

D. B. Horne, P.E.
Engineering Field Director
Virginia Department of Health
Office of Drinking Water
830 Southampton Ave., Room 2058
Norfolk, Virginia 23510

Re: Reissuance of VPDES Permit Number VA0005215
US – Norfolk Naval Shipyard
Portsmouth, Virginia

Dear Sir:

Enclosed is a copy of the referenced VPDES permit application for your review and concurrence. A copy of this application is also being provided to the Division Of Shellfish Sanitation in Richmond for their review and comment.

Please submit a letter to this office within 14 days with your comments or objections or a statement verifying that the Virginia Department of Health, Office of Drinking Water, has no comments on the application. You may contact me at (757) 518-2161, or email at carl.thomas@deq.virginia.gov if you have any questions.

Sincerely,

Carl D. Thomas
Environmental Specialist, Senior

cc: DEQ - TRO/file (VA0005215@ECM)

Enclosure: Permit Application (via agreed upon .ftp site)

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

TIDEWATER REGIONAL OFFICE
5636 Southern Boulevard, Virginia Beach, Virginia 23462
(757) 518-2000 Fax (757) 518-2009
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Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Maria R. Nold
Regional Director

September 15, 2014

Mr. John M. Briganti
Director, Environmental Division
Norfolk Naval Shipyard
Code 106
Portsmouth, Virginia 23709-1035

Re: Reissuance of VPDES Permit Number VA0005215
Norfolk Naval Shipyard, Portsmouth, Virginia

Dear Mr. Briganti:

By letter of September 8, 2014, you requested that the Department consider specific issues related to the preparation of a VPDES permit application package, due for submission to this office by not later than December 29, 2014. Your letter and supporting information prepared by your staff have been reviewed and the following responses apply.

If composite sampling is necessary for industrial process wastewater discharges, as required by EPA Form 3510-2C, it will be necessary to conduct that composite sampling consistent with the sample type required by your current VPDES permit. Your request to perform 8–hour composite sampling at the seven (7) process wastewater discharge points, in lieu of the 24-hour composite samples alluded to by that information and data reporting form, is reasonable and hereby granted.

As noted in your letter, flow-weighted composite sampling is required for point source discharges of storm water runoff from industrial facilities, as promoted by EPA Form 3510-2F. For the reasons set forth in your letter, grab samples of those point source discharges is sufficient for the purpose of completing the permit application package and development of the permit for the next five-year term. In this regard, your request to forego flow-weighted composite sampling of industrial storm water discharges, is granted.

For the reasons and rationale provided in your letter, the Command may forego sampling outfalls 300 and 501, for the purpose of preparing the permit application. Should the discharge status of those outfalls change, please have your staff contact this office for further discussion in this regard.

With respect to verifying the continued applicability of all effluent mixing zone evaluations, which are incorporated into the current VPDES permit, it will be necessary to address each outfall and the relevant mixing zone evaluation, as part of the application. As discussed with members of your staff, the mixing zone studies do not need to be replicated but the site specific conditions under which each outfall's evaluation was performed must be reviewed to determine if they remain consistent and applicable for continued use in the reissued VPDES permit (e.g., receiving stream conditions, industrial activities, wastewater flows, etc.).

Pertaining to EPA Form 3510-2F, and its allowance to select certain industrial storm water point source discharges for stipulated sampling to represent the overall quality of other similar discharge points, the following discussions apply. The table developed by your staff has been reviewed and with the exception of the following specific issues, the Command's request in this regard is approved.

At the last reissuance, outfall 400 was selected as the representative storm water discharge from the facility's Graving Drydocks. In your letter, it was noted that the scope and duration of industrial activities in and around the site's drydocks are variable and subject to change over time. In this regard, it is expected that the most industrially active drydock will be sampled to complete EPA Form 3510-2F, and sufficient documentation provided to verify that determination on the part of the Command. Should it be the case that multiple drydocks are industrially active at the time of sampling for the application, it may be necessary to sample more than one of those locations should the specific industrial activities vary significantly (e.g., interior work vs. exterior work, hull coating application vs. removal, surface vessels vs. other classes of vessels, etc.). In this regard, it is requested that your staff contact this office to discuss this matter further, as the time to perform sampling approaches. That action will be necessary to reach consensus on the outfall, or outfalls, from which samples will be obtained for analyses and reporting necessary to complete and further support the subject permit's application package.

For outfall 100, final runoff may be influenced by runoff from the nearby, but separately permitted, Refuse Derived Fuel power generation facility (VA0089923). Additionally, process wastewaters (outfall 103) are periodically present in discharges from this outfall. To ensure samples taken from outfall 100 are representative of storm water runoff solely from shipyard activities, including outfall 102 if present, all other probable internal discharges should be eliminated or minimized to the maximum extent practicable at the time samples are obtained for analyses.

Outfall 056 is the point from which a commingled wastewater discharge is released to surface waters (Building 174 - non-contact cooling water and shipyard industrial storm water). Outfall 956 is the co-designation assigned to outfall 056 to represent only the storm water component from that same external point source discharge. In this regard, sampling of industrial storm water runoff at outfall 956 should occur only when the non-contact cooling water discharge from Building 174 is not present, or minimized to the maximum extent practicable.

For all sampling events conducted to prepare a thorough and complete permit application package (process wastewaters, storm water runoff, non-contact cooling water, etc.), it is requested that a brief summary of actions performed, identification of actual sampling points (end-of-pipe, manholes, drop inlets, etc.), and any staff observations specific to those events be provided to further support the application and the final results provided in the application.

In conclusion, if changes to the sampling scenarios identified in your letter of September 8, 2014, are anticipated or occur in the interim between the date of this response and the time that point source discharges from the Shipyard are actually sampled for the purpose of preparing the permit application package due December 29, 2014, it is requested that your staff notify this office for concurrent review and further collaboration. In addition, once a draft permit application package is available, we would be pleased to sit down with members of your staff for a preliminary review of the materials assembled at that time. Our common goal should be that the permit application package is not only timely in submission, but complete with necessary content upon submission.

If there are any questions, or if we can be of further assistance, please feel free to contact this office.

Sincerely,

Carl D. Thomas
Environmental Specialist, Senior

cc: DEQ – TRO/file (VA0005215@ECM)

Thomas, Carl (DEQ)

From: Johnson, Michael D CIV NNSY, 106.31 [michael.d.johnson20@navy.mil]
Sent: Monday, September 08, 2014 5:40 PM
To: Thomas, Carl (DEQ)
Subject: Permit Re-newal
Attachments: Enclosure (1).docx; Enclosure (2).xlsx; NNSY Permit Re-newal.pdf
Signed By: michael.d.johnson20@navy.mil

Good Afternoon Mr. Thomas,

Please find attached the letter and associated enclosures pertaining to the renewal of NNSY's VPDES permit.

Thank you,

Michael Johnson
Environmental Engineer
NNSY, Code 106
(757)396-5728

DEPARTMENT OF THE NAVY

NORFOLK NAVAL SHIPYARD
PORTSMOUTH, VIRGINIA 23709-1035

5090
Ser 106/180
September 8, 2014

Mr. Carl Thomas
Department of Environmental Quality
5636 Southern Boulevard
Virginia Beach, VA 23462

Dear Mr. Thomas:

SUBJECT: VPDES PERMIT VA0005215 PROPOSAL FOR MONITORING IN NEW PERMIT APPLICATION

Norfolk Naval Shipyard's (NNSY) Virginia Pollutant Discharge Elimination System (VPDES) Permit Number VA0005215 expires on June 29, 2015. Part II.M of that permit requires the permittee to submit a new application at least 180 days before the expiration date of the existing permit. NNSY is beginning work to support the submittal of a new VPDES application by the required date of December 29, 2014. We have selected seven outfalls representative of Industrial Process activity (EPA Form 3510-2C Industrial Process parameters), one outfall representative of non-process wastewater (EPA Form 3510-2E) and another sixteen outfalls as being representative of all storm water drainage associated with industrial activity (EPA Form 3510-2F Storm Event parameters) as listed respectively in Enclosure (1).

Due to operational difficulties, NNSY would like to request some deviations from the sampling methodology requirements set forth in the above-mentioned EPA Forms:

- In lieu of 24-hr composite sampling, NNSY would like to conduct 8-hr composite sampling at the seven outfalls requiring sampling under EPA Form 3510-2C as this is in accordance with current sampling protocal dilineated in NNSY's VPDES permit.

- Enclosure (2) contains the proposed list of representative outfalls which will be sampled as part of the permit renewal process. During the 2009 permit re-application, NNSY was given authorization to conduct grab samples in lieu of composite samples at these outfalls since the nature of our topography and tidal influence prevents the collection of representative composite samples required by Block VII of Form 2F. NNSY requests approval that this approach can be used during this permit renewal cycle.

Upon review of the permit and the operating status of the shipyard, NNSY requests the elimination of monitoring requirements at Outfalls 300 and 501 in the future permit. The pumpwell that discharges out of Outfall 300 will be placed out of service indefinitely due to the infrequency of use coupled with technical/mechanical issues associated with the operation of the pumps that service Outfall 300. In addition, the run-off from dry-dock 3 has, for the past several years, been entirely diverted to the water collection chamber utilized by dry-dock 2, which is serviced by Outfall 200. Therefore, the discharge from Outfall 200 is representative of activity in both dry-docks 2 and 3, whereas any potential discharge from Outfall 300 would not be representative of any NNSY activity. The discharge source for Outfall 501 is identical to that of Outfall 500, and therefore monitoring at Outfall 501

would simply be redundant and provides no unique pollutant loading data. Discharges at Outfall 501 are also infrequent in nature.

NNSY Code 106.3 is currently in the process of conducting a review of the mixing zone study completed in 2010 to verify that all conclusions from that study are still pertinent to the shipyard. A follow-up letter will be submitted to DEQ once the review is complete, detailing the conclusions of the review.

NNSY desires Virginia Department of Environmental Quality input on the sampling protocol above to ensure that a complete permit application will be submitted by December 31st, 2014.

Please contact Mr. Mike Johnson at 396-5728, regarding any questions you may have on this matter.

Sincerely,

John M. Briganti
Director, Environment Division
By direction of the Shipyard Commander

Enclosures: 1. VPDES Permit VA0005215 Outfall Monitoring Considerations
2. Norfolk Naval Shipyard Substantially Identical Stormwater Outfall Groups

VPDES Permit VA0005125 Outfall Monitoring Considerations

EPA Permit Application Form	Outfall #
Industrial Process Activity (EPA Form 3510-2C)	040, 401, 100, 103, 200, 400, and 500
Non-process waste water (EPA Form 3510-2E)	056
Storm drainage associated with industrial activity (EPA Form 3510-2F)	011, 025, 032, 033, 036, 040, 044, 072, 082, 086, 092, 094, 100, 600, 956, and representative dry-dock outfall.*

*See Enclosure (2) for dry-dock outfall selection.

APPENDIX J
Representative Outfall Groupings
Storm Water Pollution Prevention Plan, Norfolk Naval Shipyard

Group	Sample Point Outfall	Explanation	Outfalls							Regulated SIC Codes								
										3731 = Ship and Boat Building or Repairing Yards						5093	3471	4499	2741
			*Outfall Number	Drainage Area (acres)	Total Area (sq. ft)	Imperv Area (sq ft)	Imperv Area (acres)	% Imperv	Runoff Coef Est	Buildings	Laydown / Other Areas	Vessel Berth	Indust Pier	Dry Dock	Boat Building or Repair	Scrap Recycling Facility	Fabricated Metal Products	Water Transportation	Printing and Publishing
1	011	Outfall 011 is on the north end of the shipyard outside of the Controlled Industrial Area (CIA). It contains stormwater runoff associated with industrial activity at Building 278. Outfall 012 is a smaller drainage area and contains only one industrial building.	011	12.51	544,936	510,088	11.71	94%	HIGH	278									
			012	2.28	99,317				HIGH	39									
2	025	These outfalls contain stormwater runoff associated with industrial activity at Buildings 31 (Print Shop) and 1575 (Mid-Atlantic Regional Maintenance Center - MARMC). They are located on the north end of the shipyard outside of the CIA. Outfall 025 was chosen as representative because is captures both buildings and encompasses a larger drainage area (approximatley 10 acres).	014	5.48	238,709	213,008	4.89	89%	HIGH										31
			017	0.9	39,204	39,204	0.9	100%	HIGH	1575									
			018	0.63	27,443	27,443	0.63	100%	HIGH	1575									
			024	0.14	6,098	6,098	0.14	100%	HIGH	1575									
			025	10.18	443,441	321,908	7.39	73%	HIGH	1575									31
3	036	These outfalls discharge stormwater runoff associated with industrial activities around Drydocks 1, 2, 3, and 4, the Drydock 1 equipment laydown area, and various industrial buildings. Outfall 036 was chosen as representative because it captures several industrial buildings as well as drydock-associated activities. It also encompasses a larger drainage area than most others in this group.	031	4.68	203,861	192,100	4.41	94%	HIGH	37 62	DD1 Laydown								
			032	1.48	64,469	64,469	1.48	100%	HIGH	62	DD1 Laydown N								
			033	1.88	81,893	81,893	1.88	100%	HIGH		DD1 Laydown DD1 Laydown N			DD1					
			034	1.03	44,867	44,867	1.03	100%	HIGH					DD1 DD2					
			035	0.11	4,792	4,792	0.11	100%	HIGH					DD1					
			036	4.64	202,118	202,118	4.64	100%	HIGH	1505 72 500 37				DD1 DD2					
			037	2.6	113,256	113,256	2.6	100%	HIGH	1425 1568 300	DD2/DD3 Refuel Area			DD2 DD3					
			038											DD3					
			039	0.39	16,988	16,988	0.39	100%	HIGH	1425				DD3					
			041	0.65	28,314	28,314	0.65	100%	HIGH					DD4					
			042	1.65	71,874	71,874	1.65	100%	HIGH					DD4					
			043	2.92	127,195	127,195	2.92	100%	HIGH	1532 261				DD4					

mo SIC RCRA Facility	Industrial Building Uses							
	Paint Shop	Grit Blast	Eating Place	Office/Admin Lodging	Treatment Facilities	Other	Warehousing	Workshops and Activities
			16	Security Forces Admin (11) General Admin (13, 17) Admin/BDQ Lodging (14) Security BEQ Lodging (15)			General Warehouse (26J) Security Boat/Equip Storage (42)	Ship Repair Training (278)
								Crane Maintenance (39)
				Engineering (30, 32, 33)			Nuclear Medium Maint/Storage (60)	Printing Shop (31)
				Engineering (29, 30)				Ship Service Support (1575)
								Ship Service Support (1575)
								Ship Service Support (1575)
			1526	Engineering (29, 30, 32, 33) Chapel (67) Admin (73)				Ship Service Support (1575) Printing Shop (31)
			1526	Chapel (67) Admin (73)			General Warehouse (23) Supply SUB Maint Support Complex (1)	Nuclear Repair Shop (37) Admin Radcon/zero (62)
								Admin Radcon/zero (62)
	300						General Warehouse (27)	
				Office Trailers (36-1, 36-2, 36-3)				Rigging Shop (1505) Nuclear Repair (22) Paint/Blasting (300) Nuclear Repair Shop (37)
	300							Rad Work Facility (1475) Rad Waste Handling (1568) Paint/Blasting (300) DDZ/DDS Refueling
								Rad Work Facility (1475)
								Rad Defueling (1519) Shipfitters (761)

Enclosure (2)

APPENDIX J

Representative Outfall Groupings

Storm Water Pollution Prevention Plan, Norfolk Naval Shipyard

Group	Sample Point Outfall	Explanation	Outfalls							Regulated SIC Codes									
										3731 = Ship and Boat Building or Repairing Yards						5093	3471	4499	2741
			*Outfall Number	Drainage Area (acres)	Total Area (sq. ft)	Imperv Area (sq ft)	Imperv Area (acres)	% Imperv	Runoff Coef Est	Buildings	Laydown / Other Areas	Vessel Berth	Indust Pier	Dry Dock	Boat Building or Repair	Scrap Recycling Facility	Fabricated Metal Products	Water Trans-portation	Printing and Publishing
4	040	Outfall 040 captures almost 20 acres of drainage area and encompases multiple shops and admin buildings, as well as Industrial Wastewater Treatment Plant (IWTP) discharge from Outfall 401. It is unique to itself.	040	19.58	852,905	786,258	18.05	92%	HIGH	1505 163 236	DD3/DD4 Laydown			DD3 DD4 DD6 DD7					

Enclosure (2)

no SIC RCRA Facility	Industrial Building Uses							
	Paint Shop	Grit Blast	Eating Place	Office/Admin Lodging	Treatment Facilities	Other	Warehousing	Workshops and Activities
			403	Dispensary (277) Admin (414)	IWTP (1485, 1557)		General Warehouse (22)	Fire Dept/MAMAC (236) Rigging Shop (1505) Ship Fitters Shop (163)

APPENDIX J
Representative Outfall Groupings
Storm Water Pollution Prevention Plan, Norfolk Naval Shipyard

Group	Sample Point Outfall	Explanation	Outfalls							Regulated SIC Codes								
										3731 = Ship and Boat Building or Repairing Yards						5093	3471	4499	2741
			*Outfall Number	Drainage Area (acres)	Total Area (sq. ft)	Imperv Area (sq ft)	Imperv Area (acres)	% Imperv	Runoff Coef Est	Buildings	Laydown / Other Areas	Vessel Berth	Indust Pier	Dry Dock	Boat Building or Repair	Scrap Recycling Facility	Fabricated Metal Products	Water Trans-portation	Printing and Publishing
5	044	This is the Pier 3 outfall group. Many of the outfalls are single catch basins with small drainage areas. They discharge stormwater runoff associated with industrial activity on and around Pier 3. 57A is included because it is located on the Pier 3 wetslip. Outfall 044 was chosen as representative because it captures Pier 3 activity and also drains the area around Buildings 235 and 261.	42A	0.07	3,049	3,049	0.07	100%	HIGH				Pier 3						
			044	3.27	142,441	142,441	3.27	100%	HIGH	235 261			Pier 3						
			44A	0.15	6,534	6,534	0.15	100%	HIGH				Pier 3						
			44B	0.05	2,178	2,178	0.05	100%	HIGH				Pier 3						
			045	3.96	172,498	172,498	3.96	100%	HIGH				Pier 3						
			45A	0.07	3,049	3,049	0.07	100%	HIGH				Pier 3						
			046	0.09	3,920	3,920	0.09	100%	HIGH				Pier 3						
			047	0.08	3,485	3,485	0.08	100%	HIGH				Pier 3						
			048	0.08	3,485	3,485	0.08	100%	HIGH				Pier 3						
			049	0.12	5,227	5,227	0.12	100%	HIGH				Pier 3						
			050	0.14	6,098	6,098	0.14	100%	HIGH				Pier 3						
			051	0.1	4,356	4,356	0.1	100%	HIGH				Pier 3						
			052	0.08	3,485	3,485	0.08	100%	HIGH				Pier 3						
			053	0.09	3,920	3,920	0.09	100%	HIGH				Pier 3						
			054	0.17	7,405	7,405	0.17	100%	HIGH				Pier 3						
			055	0.13	5,663	5,663	0.13	100%	HIGH				Pier 3						
			57A	0.13	5,663	5,663	0.13	100%	HIGH				Pier 3						
6	956	Outfall 956 is another large drainage area, almost 27 acres. It includes drainage from multiple workshops and administrative buildings. It is unique due to the once-through cooling water discharge at Building 174.	056 Cooling water 956 Storm water	26.75	1,165,230	954,835	21.92	82%	HIGH	163 226			Pier 3				195		
7	072	Outfall 072 has a large drainage area (23 acres) and contains buildings associated with machining, plating, metalworking, and fabrication. It is unique to itself.	072	23.03	1,003,187	929,135	21.33	93%	HIGH	163 171 202 234							195		

no SIC BCRA Facility	Industrial Building Uses Paint Shop	Grit Blast	Eating Place	Office/Admin Lodging	Treatment Facilities	Other	Warehousing	Workshops and Activities
								Marine Diesel Shop (234) Shipfitters (261)
			435 M-32	Engr Office (1500) Offices (M-52)				Fire Dept/MAMAC (234) Ship Fitters Shop (163) Plating Shop (195)
				Engr Office (1500)				Ship Fitters Shop (163) Machine Shop (171) Plating Shop (195) Metalworking (202) Fabrication/Testing (234)

Enclosure (2)

APPENDIX J
Representative Outfall Groupings
Storm Water Pollution Prevention Plan, Norfolk Naval Shipyard

Group	Sample Point Outfall	Explanation	Outfalls							Regulated SIC Codes									
										3731 = Ship and Boat Building or Repairing Yards						5093	3471	4499	2741
			*Outfall Number	Drainage Area (acres)	Total Area (sq. ft)	Imperv Area (sq ft)	Imperv Area (acres)	% Imperv	Runoff Coef Est	Buildings	Laydown / Other Areas	Vessel Berth	Indust Pier	Dry Dock	Boat Building or Repair	Scrap Recycling Facility	Fabricated Metal Products	Water Trans-portation	Printing and Publishing
8	086	This is the the Pier 6 Group. Theses outfalls discharge stormwater runoff associated with industrial activity on and around industrial Pier 6, as well as nearby industrial buildings. Outfall 086 was chosen as representative because it is large and captures Pier 6 activity as well as some shop buildings on the pier.	073	0.10	4,356	4,356	0.10	100%	HIGH										
			074	0.34	14,810	14,810	0.34	100%	HIGH										
			075	0.44	19,166	19,166	0.44	100%	HIGH										
			076	0.61	26,572	26,572	0.61	100%	HIGH										
			077	0.31	13,504	13,504	0.31	100%	HIGH										
			078	0.82	35,719	35,719	0.82	100%	HIGH										
			079	0.16	6,970	6,970	0.16	100%	HIGH										
			79A	0.14	6,098	6,098	0.14	100%	HIGH										
			080	0.09	3,920	3,920	0.09	100%	HIGH										
			80A	1.89	82,328	82,328	1.89	100%	HIGH	171									
			80B	1.38	60,113	60,113	1.38	100%	HIGH	171									
			80C	1.17	50,965	50,965	1.17	100%	HIGH	171									
			80D	0.07	3,049	3,049	0.07	100%	HIGH	171									
			081	1.46	63,598	63,598	1.46	100%	HIGH	171									
			083	0.1	4,356	4,356	0.1	100%	HIGH				Pier 6						
			084	0.32	13,939	13,939	0.32	100%	HIGH				Pier 6						
			085	0.27	11,761	11,761	0.27	100%	HIGH				Pier 6						
			086	3.21	139,828	139,828	3.21	100%	HIGH	273 299			Pier 6					298	
			087	0.27	11,761	11,761	0.27	100%	HIGH	1522			Pier 6						

	Industrial Building Uses							
on SIC BCRA Facility	Paint Shop	Grit Blast	Eating Place	Office/Admin Lodging	Treatment Facilities	Other	Warehousing	Workshops and Activities
								Machine Shop (171)
								Machine Shop (171)
								Machine Shop (171)
								Machine Shop (171)
								Machine Shop (171)
								Air Compressor (273) Temp Service/Project Office (298) Drydock Support (299)
								Rigger Shop (3527)

APPENDIX J
Representative Outfall Groupings
Storm Water Pollution Prevention Plan, Norfolk Naval Shipyard

Group	Sample Point Outfall	Explanation	Outfalls							Regulated SIC Codes									
										3731 = Ship and Boat Building or Repairing Yards						5093	3471	4499	2741
			*Outfall Number	Drainage Area (acres)	Total Area (sq. ft)	Imperv Area (sq ft)	Imperv Area (acres)	% Imperv	Runoff Coef Est	Buildings	Laydown / Other Areas	Vessel Berth	Indust Pier	Dry Dock	Boat Building or Repair	Scrap Recycling Facility	Fabricated Metal Products	Water Trans-portation	Printing and Publishing
			088	0.83	36,155	36,155	0.83	100%	HIGH	1517			Pier 6						
			089	2.06	89,734	89,734	2.06	100%	HIGH	273			Pier 6	DD8					
			090	0.17	7,405	7,405	0.17	100%	HIGH				Pier 6						
9	082	Outfall 082's drainage area is very large at 81 acres. It is unique because of the tipping platform at Building 1460.	082	81.27	3,540,121	3,093,196	71.01	87%	HIGH	1440 1498 171 172 184 268 269 271 279 510	DD8 Laydown NW Pier 6 Laydown		Pier 6	DD8		1460		298	
10	092	Outfall 092 is large, with a 27 acre drainage area. It is unique because of tipping platform at Building 1460 and various storage/laydown areas.	092	27.6	1,202,256	1,198,771	27.52	100%	HIGH	1452 1452B 1454 1490 1492 1523	Scaffolding Yard (1454) Temp Services Equip (1492) Boat BRC Stowage Yard DD8 Laydown SW			DD8	369	1460		Vessel Berth	
11	094	This is the Southern Vessel Berth group. These outfalls discharge stormwater runoff associated with industrial activity occuring on and around the vessel mooring area south of Drydock 8. Outfall 094 was chosen as representative because it is by far the largest and will also capture the Rigging Lot.	091	0.27	11,761	11,761	0.27	100%	HIGH									Vessel Berth	
			093	0.6	26,136	26,136	0.6	100%	HIGH						369			Vessel Berth	
			094	10.86	473,062	473,062	10.86	100%	HIGH		"Rigging Lot"				369			Vessel Berth	
			095	0.25	10,890	10,890	0.25	100%	HIGH									Vessel Berth	
			096	0.93	40,511	40,511	0.93	100%	HIGH									Vessel Berth	
			097	0.63	27,443	27,443	0.63	100%	HIGH									Vessel Berth	
			098	0.48	20,909	20,909	0.48	100%	HIGH									Vessel Berth	
			099	0.8	34,848	34,848	0.8	100%	HIGH									Vessel Berth	
12	100	Outfall 100 is unique because its disharge includes stormwater runoff from the Refuse Derived Fuel (RDF) facility and effluent flow from the Centralized Pier Pretreatment Unit (CPPU) facility from Outfall 103.	100	16.49	718,304	627,264	14.40	87%	HIGH		"Rigging Lot"								
13	600	Outfall 600 is unique because of the RCRA facility at Building 506, and a rail car scrapping area at Building 276 within its large (64 acre) drainage area.	600	63.88	2,782,613	2,204,572	50.61	79%	HIGH							276 Rail			
			200	1.81	78,844	78,844	1.81	100%	HIGH					DD1 DD2 DD4					

no SIC	Industrial Building Uses							
RCRA Facility	Paint Shop	Grit Blast	Eating Place	Office/Admin Lodging	Treatment Facilities	Other	Warehousing	Workshops and Activities
			1436					Rigger Shop (1527)
			1436					Air Compressor (273)
	1499	1499	M-23 (old) M-32	Engr Office (1500) Pass Office (1502) BEQ Lodging (1503) HR Office (491) Offices (M-22, M-32)			General Warehouse (260) Warehouse (237) S-1, S-2, S-3	Forklift Shop (1440) Paint Shop (1499) Machine Shop (171) Tipping Platform (1460) Temp Services (1492) Quality Assurance (184) Rigger Repair (Machine Shop) (260) RADCON Office (269) Air Compressor (273) Tool Issue (279) Temp Service/Project Office (293) Elec Shop Tmg (510)
		Old Blasting area (1452/ 1452B)					General Warehouse (260)	Old Blasting Area (1452/1452B) Scaffolding (1454) Tipping Platform (1460) Rigger Shop (1490, 1528) Temp Services (1492) Boat Shop/Component Storage (369)
								Boat Shop/Storage (369)
								Boat Shop/Storage (369)
					CPPU (1593)			RDF Facility discharges to outfall
506			1484	Pass Office (1502) BEQ Lodging (1503, 1531, 1535, 1590) Gym (310)			Warehouse (1507) General Warehouse (226, 463, 464) Plant/Material Storage (280) Compressed Gas Storage (281) Haz Waste Storage (506)	

Enclosure (2)

APPENDIX J
Representative Outfall Groupings
Storm Water Pollution Prevention Plan, Norfolk Naval Shipyard

Group	Sample Point Outfall	Explanation	Outfalls							Regulated SIC Codes								
										3731 = Ship and Boat Building or Repairing Yards						5093	3471	4499	2741
			*Outfall Number	Drainage Area (acres)	Total Area (sq. ft)	Imperv Area (sq ft)	Imperv Area (acres)	% Imperv	Runoff Coef Est	Buildings	Laydown / Other Areas	Vessel Berth	Indust Pier	Dry Dock	Boat Building or Repair	Scrap Recycling Facility	Fabricated Metal Products	Water Transportation	Printing and Publishing
14	varies	These outfalls discharge stormwater runoff associated with industrial acitivity within the various drydock facilities at NNSY. There is no designated representative outfall because although they are substantially identical to one another, the drydocks' schedules vary. NNSY will choose a representative outfall for each quarter based on docking schedules and other valid considerations.	300	2.24	97,574	97,574	2.24	100%	HIGH					DD3					
			400	4.86	211,702	211,702	4.86	100%	HIGH		DD6/DD7			DD4 DD6 DD7					
			500	4.11	179,032	179,032	4.11	100%	HIGH					DD8					

*Note: The outfall in red is the sampled outfall representing the grouping.

no SIC	Industrial Building Uses							
RCRA Facility	Paint Shop	Grit Blast	Eating Place	Office/Admin Lodging	Treatment Facilities	Other	Warehousing	Workshops and Activities

M E M O R A N D U M

DEPARTMENT OF ENVIRONMENTAL QUALITY
TIDEWATER REGIONAL OFFICE

5636 Southern Boulevard Virginia Beach, VA 23462

SUBJECT: Determination of Applicability Of Centralized Waste Treatment Regulations (40 CFR 437) To Shipyards

TO: Jim McConathy, Carl Thomas

FROM: Clyde Gantt - Water Permits Engineer

DATE: September 30, 2004

COPIES: HRSD - Industrial Waste Division

In the Tidewater Region there are numerous shipyards conducting ship repair, construction, maintenance, and wastewater treatment. Because of these types of operations, there have been questions on the applicability of the Centralized Waste Treatment Regulations to shipyard operations.

The regulations are very specific in relation to shipyards.

- Part 437.1, *General Applicability* addresses shipyards in paragraph (c)"This part does not apply to the following activities:…" Paragraph(2) "The discharge of marine generated wastes……as part of routine ship maintenance and operation as long as they are treated and discharged at the ship servicing facility where it is off-loaded.
- Paragraph(2) also goes on to state "The discharges resulting from the treatment of marine generated wastes that are off loaded and subsequently sent to a CWT facility at a separate location are, however, subject to this part".
- Table V.A-1.-*Examples of Regulated and Non-Regulated CWT Operations* specifically lists marine generated wastes sent to a separate location as an example of "Regulated by this rule".
- Part 437.V *Scope/Applicability of the Regulation* discusses considerations for various industrial sectors in development of the regulation. Section G. specifically addresses marine generated wastes. EPA's comments here reflect the language as stated above. This section also states "After careful consideration of comments, EPA has not modified its approach for marine generated wastes with one exception". That exception was the modification of the definition of "marine wastes".

Based on the above information, the CWT Regulations do apply to shipyards discharging CWT wastes (Metals/Oils/Organics/Mulitiple Wastestreams), if that permitted facility accepts CWT wastewater from off site for discharge and treatment. "Off Site" is defined as outside the boundaries of a facility. A facility is considered to be one contiguous site. Any VPDES or Pretreatment Permit issued should contain the appropriate CWT limits.

Shipyards that discharge CWT wastes that are generated on site, to include ships berthed at the site, are exempt from the CWT regulations.

DEPARTMENT OF THE NAVY

NORFOLK NAVAL SHIPYARD
PORTSMOUTH, VIRGINIA 23709-1035

5090
Ser 106/250
October 7, 2014

Mr. Carl Thomas
Department of Environmental Quality
5636 Southern Boulevard
Virginia Beach, VA 23462

Dear Mr. Thomas:

SUBJECT: EVALUATION OF MIXING ZONES AT NORFOLK NAVAL SHIPYARD OUTFALLS

Per correspondence with DEQ dated September 15th, 2014, Norfolk Naval Shipyard (NNSY) has reviewed the results of the mixing zone study submitted in February 2010 to verify that the conclusions of that study are still applicable for the renewal of NNSY's VPDES permit in 2015. Industrial activity at the shipyard, discharge pumping rates, outfall diameters and designs, and local littoral hydrology mentioned in the preivous study were compared to the current conditions at the shipyard in order to determine if there were any changes that may potentially invalidate the conclusions of the previous mixing zone study. Personnel from NNSY Code 106, Naval Facilites, NNSY dry-dock engineering, and the two waste water treatment plants on-site were consulted in the review. The review concluded that there have not been any changes to the parameters mentioned above that would impact the mixing zones at NNSY industrial outfalls. As a result, all conclusions drawn in the previous study remain valid.

Please contact Mr. Mike Johnson at 396-5728, regarding any questions you may have on this matter.

Sincerely,

John M. Brigandi
Director, Environment Division
By direction of the Shipyard Commander

DEPARTMENT OF THE NAVY
NORFOLK NAVAL SHIPYARD
PORTSMOUTH, VIRGINIA 23709-5000

5090
Ser 106/030
February 24, 2010

Mr. Carl Thomas
Department of Environmental Quality
Tidewater Regional Office
5636 Southern Boulevard
Virginia Beach, VA 23462

Dear Mr. Thomas:

SUBJECT: NORFOLK NAVAL SHIPYARD MIXING ZONE STUDY

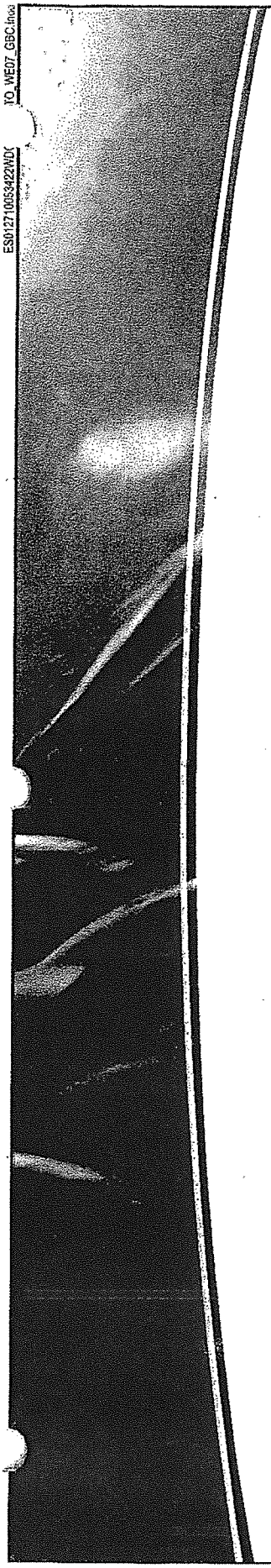
In previous correspondence pertaining to the re-issuance of Norfolk Naval Shipyard's (NNSY) Virginia Pollution Discharge Elimination System (VPDES) permit number VA0005215, the Department of Environmental Quality (DEQ) has stated that the mixing zones used in previous permit renewal applications need to be re-evaluated to consider if the facility's discharges are addressed adequately. NNSY (via a contractor) has completed a thorough study and is attached as Enclosure (1) for your review.

Should DEQ require further information concerning this matter, please contact Mr. Stephen Cobb at (757) 396-3431 or Mr. Michael Johnson at (757) 396-5728.

Sincerely,

R. G. CHANTRY
Director, Occupational Safety, Health and Environment Office
By direction of the Shipyard Commander

Enclosure: (1) Norfolk Naval Shipyard Mixing Zone Study



Norfolk Naval Shipyard
Mixing Zone Study
Portsmouth, Virginia

NAVFAC
Naval Facilities Engineering Command

Prepared for

Department of the Navy
Naval Facilities Engineering Command
Mid-Atlantic

Contract No.
N62470-06-D-7105
CTO-WE07

February 2010

Prepared by

CH2MHILL

Evaluation of Outfall and Discharge Changes Since the Previous Mixing Zone Studies for Norfolk Naval Shipyard

PREPARED FOR: U.S. Navy, Norfolk Naval Shipyard

PREPARED BY: Tom Dupuis/CH2M HILL

COPIES: Shelly Frie/CH2M HILL
Brad Paulson/CH2M HILL

DATE: October 21, 2009

Background

Norfolk Naval Shipyard (NNSY) has previously conducted mixing zone studies for their four drydocks (outfalls 200, 300, 400, and 500), cooling water discharges from a power plant (outfall 056), and discharges from their two industrial wastewater treatment plants (IWTPs) (outfalls 100 and 040). These mixing zones studies determined dilution factors based on dye studies, near-field modeling, and far-field modeling conducted by CH2M HILL in 1996 and 1999[1]. The methods and results of these studies were accepted by the Virginia Department of Environmental Quality (DEQ) and the results were subsequently used by DEQ to evaluate and/or establish NPDES permit limitations for the NNSY.

The key assumptions, inputs and results of these previous studies are summarized in Table 1. For the four drydock discharges, which are intermittent and composed primarily of river leakage and stormwater that collects in sumps, only the near-field allocated impact zone (AIZ) was relevant. The AIZ is applicable to acute toxicity criteria and associated permit limits. For the other three outfalls, which had continuous discharges, both the AIZ and the far-field regulatory mixing zone (RMZ) were applicable. The RMZ is applicable to chronic toxicity criteria and associated permit limits. The dilution at the RMZ is also used to adjust the AIZ dilution to determine the "effective" dilution of continuous discharges in tidally influenced receiving waters.

DEQ has stated that the mixing zones need to be re-evaluated on an outfall by outfall basis to provide sufficient information to determine if the dilution factors established for the facility's discharges by previously approved effluent mixing zone models remain valid. Since there have been or will soon be changes to some of the outfalls' discharges and other future changes are planned, NNSY is interested in updating the mixing zone study to determine the dilution of the effluents so that realistic permit limitations can be developed.

[1] Mixing Zone Study for Naval Shipyard Norfolk, CH2M HILL, August 1996; Mixing Zone Study for Outfall 100, CH2M HILL, June 1999.

This Technical Memorandum (TM) documents changes to key parameters at each outfall that could affect dilution factors and evaluates whether the changes make the dilution factors no less stringent than those determined in the previous studies. For those outfalls where changes may make the dilution factors more stringent or if it is difficult to predict the impact of the changes on dilution factors, this TM documents the rationale for performing future analysis.

Documentation and Evaluation of Changes

Most of the changes in flow to the NNSY outfalls were documented by the Navy in the Scope of Work (SOW) for this project. In addition, a kick-off and information gathering meeting and conference call was held on September 22, 2009 during which some additional clarifications were provided by the Navy. Finally, the Navy provided additional follow-up information to CH2M HILL subsequent to the kick-off meeting/call. These changes and the evaluation of their effects on dilution are provided below for each outfall.

In the previous mixing zone report, it was noted that Tide-Flex duck-bill check valves were going to be installed on the drydock outfalls. These outfalls were modeled as if they had fully open pipes. This was a conservative approach because these valves, if later installed, would generally lead to smaller effective discharge diameters which would lead to higher discharge velocities and likely higher AIZ dilution values. Subsequent to the kick-off call, the Navy confirmed that Tide-Flex valves were not installed on any of the outfalls but that metal flapper-gate check valves have been installed. If it is assumed that these valves are fully open during pumping events, their presence would not substantially effect dilution determinations.

Outfall 200

The Navy provided information showing that drydock 2 has five pumps ranging in capacity from 1,000 to 4,500 gallons per minute (gpm) with a total maximum pumping capacity of 9,000 gpm. Although 9,000 gpm represents the highest discharge flow at any given time, the Navy has indicated that this flow might occur only momentarily, and that 4,500 gpm would be the flow rate most of the time. Thus, the assumptions, inputs, and results from the previous mixing zone study as listed in Table 1 are still applicable to this outfall at the flow rate of 4,500 gpm. Although the highest discharge velocity would obviously occur at 9,000 gpm, and hence likely result in increased dilution, this flow would occur only for a momentary period and is not representative of the critical operating condition from a dilution perspective. Thus, that flow should not be modeled. The critical condition will be on the low end of the flow range. The lowest potential discharge flow is 1,000 gpm which likely would have substantially lower dilution because discharge velocities would be lower than with flow at 4,500 gpm as previously modeled. This can be readily evaluated with new model runs at the lower discharge flow.

Outfall 300

The Navy provided information describing the discharge diameter for this outfall as 10 inches instead of 12 inches as used in the previous mixing zone study. Because the pump capacity is the same, this reduction in pipe diameter will result in greater discharge velocity than was previously modeled and this greater discharge velocity should result in slightly

higher dilution at the AIZ. This change can be readily evaluated with a new model run using the smaller pipe size but the dilution difference will not likely be substantive.

Outfall 400

Flows from drydocks 6 and 7 have been re-routed from outfall 400 to outfall 040. The Navy provided information stating that the discharge pump for drydock 4 has a capacity of 5,000 gpm rather than the 4,500 gpm used previously. The outfall configuration otherwise remains the same. Thus, one operational difference is that discharges are less frequent and/or of shorter duration, but that difference would not affect modeling methods, assumptions or results. The higher discharge flow of 5,000 gpm will result, however, in greater port velocity than was previously modeled. This greater port velocity should result in slightly higher dilution at the AIZ. This change can be readily evaluated with a new model run at the higher flow but the dilution difference will not likely be substantive.

Outfall 500

Outfall 500 has two pumps currently operating at a maximum discharge of 9,500 gpm. The Navy provided information describing the discharge pipe diameter as 24 inches rather than 20 inches. Thus, the previous modeling at 9,500 gpm represents the correct discharge flow scenario but does not represent the new pipe diameter. The larger pipe diameter will have lower discharge velocity, and thus likely have slightly lower dilution. This change can be readily evaluated with a new model run at the larger diameter, but the dilution difference will not likely be substantive.

Outfall 501 (New Outfall)

A new 15,000 gpm pump will be installed in the future at drydock 8 to pump cooling water from vessels hosted in the dock. The pump will convey flow to a concrete flume that discharges near the surface of the water. This outfall was not previously modeled but this outfall/discharge configuration can be readily evaluated using the PDS model similar to the modeling for the other drydock outfalls above.

Outfall 040

Dry weather baseflow in the pipe to outfall 040 has increased from 0.025 mgd to 0.040 mgd. Also, current flow for outfall 401 (IWTP) is now 0.040 mgd on an intermittent basis, compared to a continuous flow of 0.025 mgd that was occurring during the original dye study. In the previous study report, it was recognized that actual operation had changed to a batch discharge at 0.144 mgd subsequent to completion of the dye study. It was concluded in that study, however, that this change would not substantially affect the dilution determination for this outfall.

Also, the Navy provided updated information on the local water depth (LWD) in the vicinity of this outfall which is 37 feet (compared to ~ 5 to 6 feet for the previous study). This will substantially increase the distance to the boundary of the AIZ which was previously controlled by the LWD criterion and will now be controlled by the discharge length scale (DLS) criterion. Because the AIZ boundary will now be extended further out because of much deeper LWD than previously assumed, the amount of dilution within the AIZ would be expected to be higher.

The increased baseflow will increase the internal dilution that occurs in the pipe, although the exact same increase in the IWTP flow will directly counterbalance that effect. The increase in the combined flow will lead to slightly higher discharge velocity from the stormwater pipe but may also potentially counteract the higher plume volume within the AIZ.

Additionally, flows from drydocks 6 and 7 have been re-routed from outfall 400 to outfall 040. Dry docks 6 and 7 flows include stormwater discharges, groundwater leakage, and discharge intermittently at a rate of 500 gpm.

The dye study methodology was originally selected for this outfall because the situation is too complex for computer modeling using off-the-shelf EPA-approved models. This remains the case today and thus a new dye study will be needed to address the changes. Additional discussion with the Navy will be needed to determine how to evaluate the effect of flows from both the IWTP and drydocks 6 and 7 for the dye study. Because the discharge is now intermittent, there does not appear to be the need to evaluate the chronic toxicity, dilution at the RMZ, or to adjust the AIZ dilution to effective dilution.

Outfall 056

The previously modeled flows for outfall 056 were 2.22 mgd and 4.44 mgd and the current flow is 1.11 mgd. In the previous study it was determined that 4.44 mgd resulted in lower dilution than the 2.22 mgd flow, and thus it was the critical dilution assigned to this outfall for permitting purposes. The reason that 4.44 mgd had lower dilution was that the plume was larger and surfaced earlier than at the lower flow. Because of model limitations, dilution predictions were not interpreted beyond where the plume surfaces, even though the formal AIZ boundary was more distant for this outfall than where the plumes were predicted to surface. A similar outcome with an even lower discharge flow of 1.11 mgd would be expected, and hence a substantially higher dilution would be expected at this lower flow.

The Navy also provided information that the box culvert is actually 6 feet by 4 feet rather than the 8 feet by 5 feet as previously evaluated.

The model should be rerun with a flow of 1.11 mgd to confirm higher dilution at the lower flow and to represent the smaller box culvert now being used for this outfall.

Outfall 100

At outfall 100, NNSY has the capability to discharge from six drydock units at 50 gpm each. The previous dye study was based on operation of three units with a total flow of 150 gpm. The new flow to be evaluated is 300 gpm (all six units). As with outfall 040, this shallow water near surface discharge through a large stormwater pipe is complex and cannot be evaluated using off-the-shelf EPA-approved computer models. Since the pipe diameter is so large (72 inches), an additional flow of 150 gpm is not expected to significantly change the dilution but a new dye study would verify if the increased plume volume is offset by the increased discharge velocity. Also, the Navy provided updated information on the local water depth (LWD) in the vicinity of this outfall which is 5 to 6 feet (compared to 3 feet for the previous study). This will increase the distance to the boundary of the AIZ which is controlled by the LWD criterion. Because the AIZ boundary will now be extended further

out because of deeper LWD than previously assumed, the amount of dilution within the AIZ would be expected to be higher.

Summary

Outfall 200 should be modeled at a low flow of 1,000 gpm. The previous model results for the maximum discharge flow of 4,500 gpm remain unchanged.

New model runs for outfalls 300 and 400 would lead to slightly higher dilution values because of a smaller pipe diameter and higher discharge flow, respectively. The increased dilution would not be consequential.

Outfall 500 should be modeled again with the new pipe diameter at a flow of 9,500 gpm. It is expected that the predicted dilution will be slightly lower because of lower discharge velocity.

Outfall 501 should be modeled with PDS at the proposed new pump flow at 15,000 gpm. Because this is an intermittent discharge, only AIZ dilution will be relevant.

Outfall 056 should be modeled again with the new, lower discharge flow and new box culvert dimensions. The dilution prediction is expected to be substantially higher.

New field dye studies are needed for outfalls 040 and 100, because of outfall complexities and substantially changed conditions.

Table 1. Summary of Previous Dilution Study Assumptions, Inputs, Results and Changes for the NNSY Outfall Discharges

Outfall Number	Wastewater Sources	Outfall Description	Discharge Flow	Local Water Depth, ft.	Mixing Zones	Models Used [2]	Dilution Results	Changes to Discharge Conditions and Pipes Since the Previous Study [1]
200	Drydocks 1, 2 and 3	20" dia. pipe, near surface	4,500 gpm intermittent	40	AIZ	PDS	13:1	Drydock 2 discharge flow range = 1,000 to 4,500 gpm LWD = 41'
300	Drydock 3	12" dia. pipe, near surface	900 gpm intermittent	40	AIZ	PDS	12:1	10" dia. outfall pipe LWD = 39'
400	Drydocks 4, 6 and 7	20" dia. pipe, near surface	4,500 gpm intermittent	40	AIZ	PDS	13:1	5,000 gpm intermittent Drydocks 6 and 7 no longer discharge to outfall 400 LWD = 41'
500	Drydock 8	20" dia. pipe, near surface	9,500 gpm intermittent	40	AIZ	PDS	17:1	24" dia. outfall pipe LWD = 45'
501	Drydock 8	12' x 10' concrete flume	15,000 gpm intermittent	TBD	AIZ	Not previously modeled	Not previously modeled	Future 15,000 gpm intermittent flow
040	IWTP (internal outfall 401)	30" dia. storm pipe, near surface	Baseflow = 0.025 mgd 401 flow = 0.025 mgd continuous	~5-6	AIZ and RMZ	AIZ: Dye study RMZ: PT121	AIZ - 12:1 (12:1 effective) RMZ - 2,130:1	Baseflow = 0.040 mgd continuous 401 flow = 0.040 mgd intermittent Drydocks 6 and 7 now discharge to outfall 040 and flow = 500 gpm intermittent LWD = 37'
056	Power plant cooling water	8' x 5' box, invert ~13' below water surface	4.4 mgd continuous	40	AIZ and RMZ	AIZ: UDKHDEN RMZ: PT121	AIZ - 27:1 (18:1 effective) RMZ - 54:1	1.11 mgd continuous Box is now 6' by 4' LWD = 45'
100	IWTP	72" dia. storm pipe, near surface	150 gpm continuous	3	AIZ and RMZ	AIZ: Dye study RMZ: PT121	AIZ - 13:1 (13:1 effective) RMZ - 1,360	300 gpm continuous LWD = 5-6'

[1] Updated local water depths (LWDs) are average values and are based on 2005 hydrographic condition survey information.
[2] DOS-based versions of the PDS and UDKHDEN models which were developed for EPA were used. These models are still available in the Visual Plumes modeling package supported by EPA. The PT121 model was developed by CH2M HILL.

Updates to the Evaluation of Outfall and Discharge Changes Since the Previous Mixing Zone Studies for Norfolk Naval Shipyard

PREPARED FOR: U.S. Navy, Norfolk Naval Shipyard

PREPARED BY: Shelly Frie

COPIES: Tom Dupuis/CH2M HILL
Brad Paulson/CH2M HILL

DATE: February 3, 2010

PROJECT NUMBER: 393659

This technical memorandum provides updates to the previous technical memorandum titled *Evaluation of Outfall and Discharge Changes Since the Previous Mixing Zone Studies for Norfolk Naval Shipyard* and dated October 21, 2009. New information regarding the proposed discharges at Outfall 501 is described below and updated in Table 1. The depth for Outfall 040 was reported incorrectly as 37 feet in the previous technical memorandum and has been updated to the correct depth of 5 to 6 feet in Table 1. The depth for Outfall 100 was reported incorrectly as 5 to 6 feet in the previous technical memorandum and has been updated to the correct depth of 3 feet in Table 1.

Outfall 501 (New Outfall)

In addition to a new 15,000 gpm pump that will be installed in the future at Drydock 8 at Outfall 501, a new auxiliary ship water (ASW) system will be installed to pump cooling water from vessels hosted in the dock. The ASW system will have a maximum flow of 4,100 gpm. The discharge from the new 15,000 gpm pump will consist of primarily of SWPBFP, stormwater, cooling water, silt washdown after initial draining of the drydock, HVAC and steam condensate that collects in the sump. The 15,000 gpm pump and the ASW system will convey flow to a 12-foot wide by 16-foot deep concrete flume and based on available design drawings, the invert elevation of the flume is at 77.0 feet which is 16.1 feet below the MLW elevation of 93.08 feet. Thus, the top of the flume lies just beneath the water surface at the MLW elevation. This outfall is described in more detail in the technical memorandum titled *Mixing Zone Modeling Evaluation of Norfolk Naval Shipyard Outfalls* and dated February 2010.

Table 1. Summary of Previous Dilution Study Assumptions, Inputs, Results and Changes for the NNSY Outfall Discharges

Outfall Number	Wastewater Sources	Outfall Description	Discharge Flow	Local Water Depth, ft.	Mixing Zones	Models Used [2]	Dilution Results	Changes to Discharge Conditions and Pipes Since the Previous Study [1]
200	Drydocks 1, 2 and 3	20" dia. pipe, near surface	4,500 gpm intermittent	40	AIZ	PDS	13:1	Drydock 2 discharge flow range = 1,000 to 4,500 gpm LWD = 41'
300	Drydock 3	12" dia. pipe, near surface	900 gpm intermittent	40	AIZ	PDS	12:1	10" dia. outfall pipe LWD = 39'
400	Drydocks 4, 6 and 7	20" dia. pipe, near surface	4,500 gpm intermittent	40	AIZ	PDS	13:1	5,000 gpm intermittent Drydocks 6 and 7 no longer discharge to Outfall 400 LWD = 41'
500	Drydock 8	20" dia. pipe, near surface	9,500 gpm intermittent	40	AIZ	PDS	17:1	24" dia. outfall pipe LWD = 45'
501(New)	Drydock 8	12' x 16' concrete flume	4,100 gpm and 15,000 gpm intermittent	TBD	AIZ	Not previously modeled	Not previously modeled	Future 4,100 gpm and 15,000 gpm intermittent flows LWD = 45'
040	IWTP (internal outfall 401)	30" dia. storm pipe, near surface	Baseflow = 0.025 mgd 401 flow = 0.025 mgd continuous	~5-6	AIZ and RMZ	AIZ: Dye study RMZ: PT121	AIZ - 12:1 (12:1 effective) RMZ - 2,130:1	Baseflow = 0.040 mgd continuous 401 flow = 0.040 mgd intermittent Drydocks 6 and 7 now discharge to Outfall 040 and flow = 500 gpm intermittent LWD has not changed.
056	Power plant cooling water	8' x 5' box, invert ~13' below water surface	4.4 mgd continuous	40	AIZ and RMZ	AIZ: UDKHDEN RMZ: PT121	AIZ - 27:1 (18:1 effective) RMZ - 54:1	1.11 mgd continuous Box is now 6' by 4' LWD = 45'
100	IWTP	72" dia. storm pipe, near surface	150 gpm continuous	3	AIZ and RMZ	AIZ: Dye study RMZ: PT121	AIZ - 13:1 (13:1 effective) RMZ - 1,360	300 gpm continuous LWD has not changed.

[1] Updated local water depths (LWDs) are average values and are based on 2005 hydrographic condition survey information.
[2] DOS-based versions of the PDS and UDKHDEN models which were developed for EPA were used. These models are still available in the Visual Plumes modeling package supported by EPA. The PT121 model was developed by CH2M HILL.

Mixing Zone Modeling Evaluation of Norfolk Naval Shipyard Outfalls Portsmouth, Virginia

Prepared for

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Naval Facilities Engineering Command
Mid-Atlantic

Norfolk, Virginia

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Mixing Zone Modeling Evaluation of Norfolk Naval Shipyard Outfalls

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Introduction

The Norfolk Naval Shipyard (NNSY) is located in Portsmouth, Virginia along the western shore of the Southern Branch of the Elizabeth River (Figure 1). Activities at the NNSY include construction, conversion, overhaul, repair, alteration, drydocking, and outfitting of naval ships. Discharges from the NNSY are regulated by a Virginia Pollutant Discharge Elimination System (VPDES) permit (No. VA0005215) which was last issued on April 24, 2005. NNSY has over 100 permitted outfalls, the majority of which are stormwater discharges.

NNSY previously conducted mixing zone studies for four drydocks (outfalls 200, 300, 400, and 500), cooling water discharges from a power plant (outfall 056), and discharges from their two industrial wastewater treatment plants (IWTPs) (outfalls 100 and 040). These mixing zones studies determined dilution factors based on dye studies, near-field modeling, and far-field modeling that were conducted by CH2M HILL in 1996 and 1999. The methods and results of these studies were accepted by the Virginia Department of Environmental Quality (DEQ) and the results were subsequently used by DEQ to evaluate and/or establish NPDES permit limitations for NNSY.

Background

The key assumptions, inputs and results of these previous studies were recently evaluated and summarized in a Technical Memorandum (TM) by CH2M HILL in October 2009. NNSY has submitted this document to DEQ for review in conjunction with the VPDES permit reapplication.

The drydock discharges under consideration are all intermittent and composed primarily of SWPBFP, stormwater, cooling water, silt washdown after initial draining of the drydock, HVAC and steam condensate that collects in sumps. For these discharges, only the near-field allocated impact zone (AIZ) was relevant. The AIZ is applicable to acute toxicity criteria and associated permit limits. For Outfall 056, which is a continuous discharge, both the AIZ and the far-field regulatory mixing zone (RMZ) were applicable. The RMZ is applicable to chronic toxicity criteria and associated permit limits. The dilution at the RMZ

is also used to adjust the AIZ dilution to determine the effective dilution of continuous discharges in tidally influenced receiving waters.

DEQ has previously stated that the mixing zones need to be re-evaluated on an outfall-by-outfall basis to provide sufficient information to determine if the dilution factors established for the facility's discharges by previously approved effluent mixing zone models remain valid. Since there have been or will soon be changes to some of the outfalls' discharges and other future changes are planned, the mixing zone study is being updated to determine the dilution of the effluents so that realistic permit limitations can be developed.

This TM documents the mixing zone (dilution) modeling that has been updated for the four drydock discharges (outfalls 200, 300, 400, and 500) and the cooling water discharge from a power plant (outfall 056). In addition, a new discharge (Outfall 501) was identified by NNSY that will discharge SWPBFP, stormwater, cooling water, silt washdown after initial draining of the drydock, HVAC and steam condensate from vessels that are hosted in Drydock 8. This outfall was not evaluated in the previous mixing zone studies.

This TM presents the modeling approach (input and assumptions) and the results of the updated modeling evaluation. Detailed descriptions of the nearfield and farfield models used–including model theory and input data sources – were provided in the previous mixing zone studies conducted for NNSY (CH2M HILL, 1996; 1999).

Study Area Description

The Norfolk Naval Shipyard is located in the Southern Branch of the Elizabeth River in eastern Virginia. The Elizabeth River System is a tidally-influenced branch of the James River system which, in turn, is a branch of Chesapeake Bay.

The Elizabeth River watershed is approximately 300 square miles. Freshwater input to the system is generally low and consists mainly of stormwater runoff and drainage from the Dismal Swamp (VMS, 1981). When freshwater flows are low, tidal action in the system is sufficient to produce a vertically well-mixed and laterally homogeneous estuarine classification; however, when stratification does exist, a non-tidal circulation occurs that enhances flushing from the system (VIMS, 1975). Therefore, the worst-case conditions for flushing occur when the river is vertically well-mixed. This occurs in the late summer or early fall when freshwater flows are at a minimum. DEQ has previously confirmed that the summer (unstratified) condition is the appropriate critical condition on which to base mixing modeling in the Elizabeth River area (DEQ, 1996).

The water depth in the Southern Branch of the Elizabeth River varies from a few feet near the banks to over 40 feet in the navigation channel at mean low water (MLW). The deeper portions of the river are routinely dredged for shipping traffic. The most recent hydrographic condition survey information was provided by NNSY and was used to update local water depths in the vicinity of the outfalls.

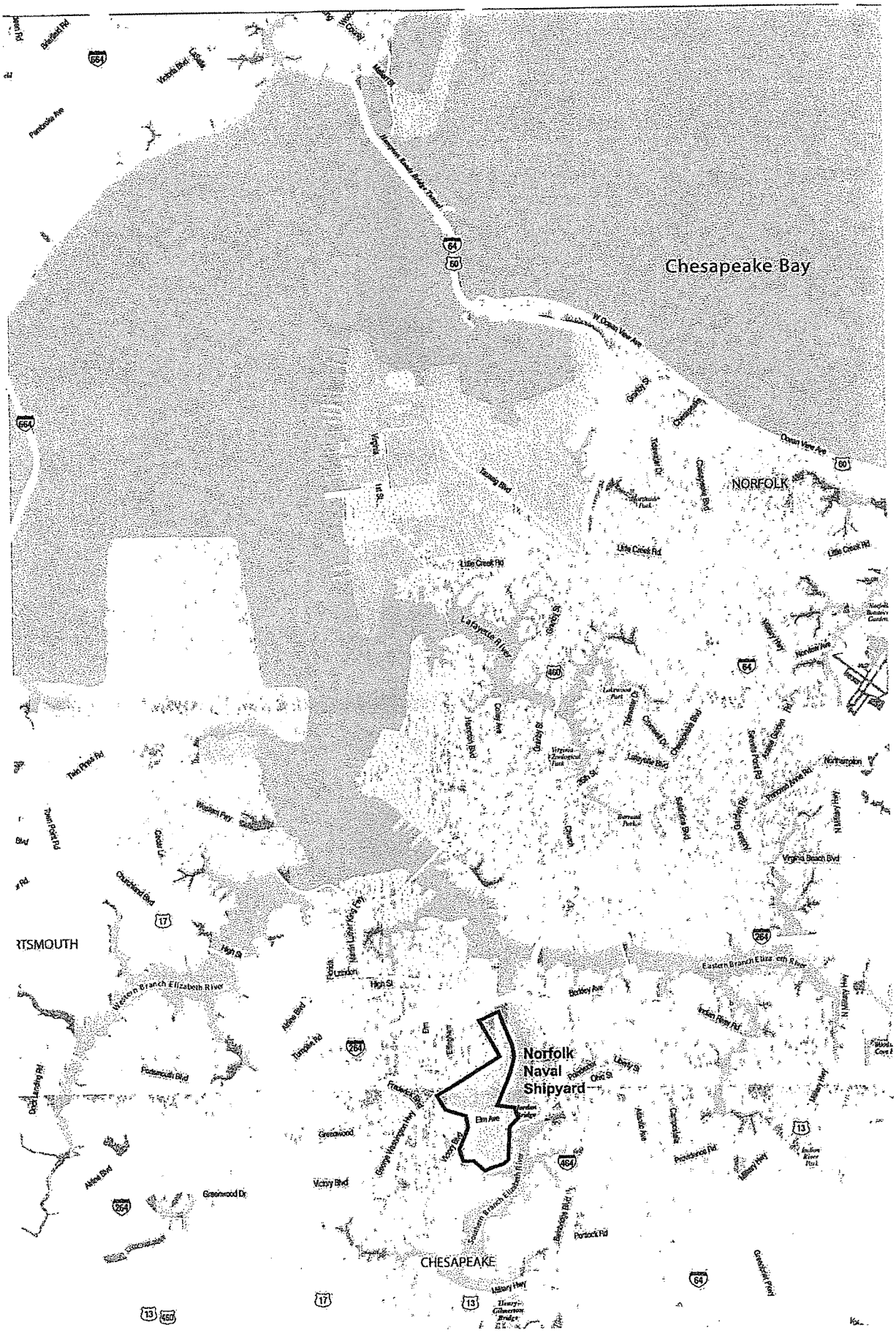

FIGURE 1
Location of Norfolk Naval Shipyard
NNSY Mixing Zone Study

CH2MHILL

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Outfalls Evaluated

Drydock Outfalls

Four drydock outfalls with significant dry weather flow were modeled in this evaluation. The outfalls analyzed are shown in Figure 2. Outfalls 200, 300, 400, and 500 are the dewatering discharge points for the Norfolk Naval Shipyard's eight drydocks. In order to create a dry working environment for ship repair and maintenance, a ship is floated directly into a drydock when the drydock is full of water. The drydock door is then closed and the water is pumped out. As the water is pumped out, the ship comes to rest on supports that lie underneath it so personnel can perform repairs or maintenance in a dry environment. Drydock outfalls typically discharge for 2 to 8 hours during initial dewatering and then for several minutes every few hours to pump out leakage, stormwater, or other drainage. The Virginia DEQ's primary permitting concern for the drydock outfalls is stormwater and cooling water discharges, not the initial pump-out. As with the previous mixing zone studies, this modeling analysis focuses on the intermittent discharges rather than initial dewatering.

Because of the intermittent nature of these discharges, only acute criteria are applicable; therefore, dilution only at the edge of the AIZ needs to be determined. For continuous discharges, the initial dilution predicted by models is adjusted to take into account the effluent in the receiving water. Because the drydock discharges are not continuous, the dilution predicted by the initial dilution models does not have to be adjusted to an effective dilution value.

The drydock discharges are fully submerged during mean high water conditions and at least partially submerged under MLW conditions. However, because the discharges are so close to the water surface even when submerged, a surface discharge dilution model was used to predict dilution at the edge of the AIZ for those outfalls.

Outfall 056

Outfall 056 is a discharge tunnel that is 6 feet wide by 4 feet deep. Once-through cooling water pumped from the Elizabeth River is discharged to Outfall 056, which is located in Slip 3 in the Southern Branch of the Elizabeth River, as shown in Figure 2. The invert elevation of the discharge tunnel is about 13 feet below the water surface at MLW. The water depth in the vicinity of the discharge is about 45 feet. The previously modeled flows for outfall 056 were 2.22 mgd and 4.44 mgd; the current flow is 1.11 mgd.

Outfall 501

A new auxiliary ship water (ASW) system with a maximum flow rate of 4,100 gpm will be installed in the future at Drydock 8 to pump cooling water from vessels hosted in the dock. A new 15,000 gpm pump will also be installed at Outfall 501 to serve as a backup pump to the two existing pumps that currently serve Drydock 8 and discharge at Outfall 500. The discharge from the 15,000 gpm pump will consist of SWPBFP, stormwater, cooling water, HVAC, and steam condensate, and silt washdown after initial draining of the drydock. The Outfall 501 discharge point is located approximately 50 to 100 feet from Outfall 500 at Berth 42. The pump will convey flow to a 12-foot wide by 16-foot deep concrete flume and based

on available design drawings, the invert elevation of the flume is at 77.0 feet which is 16.1 feet below the MLW elevation of 93.08 feet. Thus, the top of the flume lies just beneath the water surface at the MLW elevation.

Modeling Approach

The amount of mixing that is achieved at the edge of the AIZ was determined for each of the outfalls. In addition, the amount of mixing achieved at the RMZ was also determined for the continuous dry weather flow discharge (Outfall 056). Worst-case conditions with respect to effluent mixing and dilution phenomena were modeled. This was accomplished by running the models under conditions where dilution is inhibited. For the farfield model, these conditions included maximum outfall discharge rate, zero freshwater inflow from upstream sources, and a well-mixed (unstratified) salinity regime. This is representative of worst-case late summer or early fall conditions in the Elizabeth River. Freshwater inflows to the Elizabeth River are probably never zero. However, as a conservative approach to the modeling, the assumption of zero freshwater inflow was made in this analysis.

Initial dilution modeling was performed for the worst-case discharge conditions over a full cycle of tidal conditions using NOAA tidal data for Station ID No. 8638660 (Portsmouth, VA Norfolk Naval Shipyard) and obtained http://tidesandcurrents.noaa.gov/. Twelve hourly values for current velocity from the mean tidal cycle were modeled for the worst- case effluent conditions. The final dilution value is an average of dilutions obtained from model runs using the 12 hourly current values over the mean tidal cycle under worst-case discharge conditions. This approach produces a reasonable worst-case dilution factor for the discharge and is consistent with the approach used by DEQ to permit Hampton Roads Sanitation District (HRSD) outfalls in the Hampton Roads area (HydroQual, 1991).

Available initial dilution models assume that the source of dilution water is unaffected by the effluent discharge. However, in an estuarine system, tidal effects cause the ambient receiving water to move back and forth over time, resulting in a long-term average ambient mixture containing some fraction of the effluent. Thus, for the continuous dry weather discharges, the initial dilution model must be supplemented with a farfield model used for ambient conditions. In practice, this means running the models separately, but correcting the initial dilution model results to account for ambient conditions (often referred to as 'effective dilution').

The objectives of this modeling evaluation were to determine the amount of dilution that will occur within the RMZ (Outfall 056) and at the AIZ for the drydock outfalls (200, 300, 400, 500, and 501). This mixing zone study followed the guidelines presented in the EPA Technical Support Document (TSD) for Water Quality-Based Toxics Control (EPA, 1991).

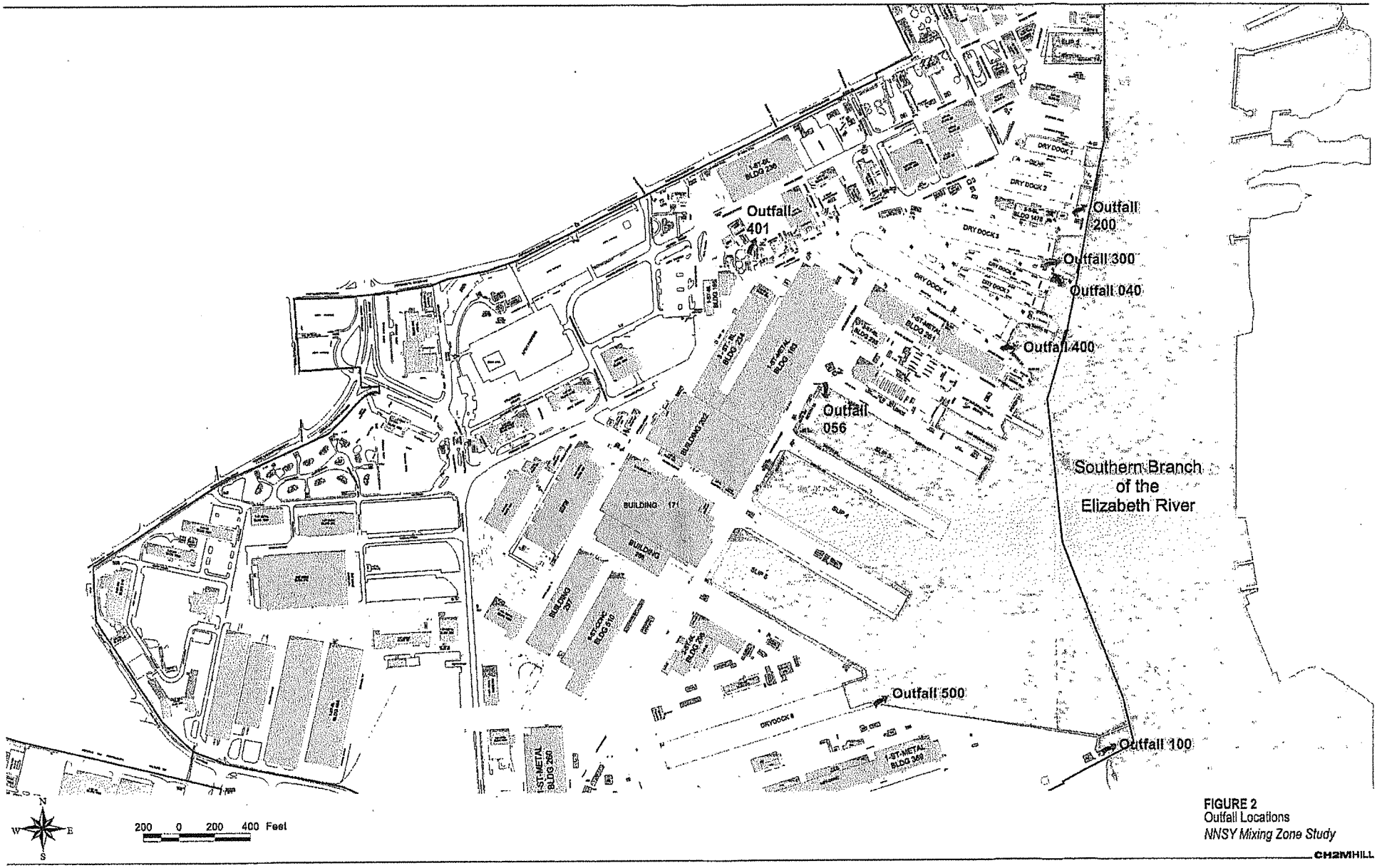

FIGURE 2
Outfall Locations
NNSY Mixing Zone Study

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Initial Dilution Modeling Analysis and Results

Description of Models Used

As with the previous mixing zone study, the EPA-approved initial dilution model UDKHDEN was used to analyze initial dilution of the submerged dry weather outfall at the NNSY. UDKHDEN is listed in EPA's TSD as an appropriate model for predicting dilution at the AIZ boundary (EPA, 1991). UDKHDEN is a fully three-dimensional model that considers variable profiles throughout the zone of flow establishment and after adjacent plumes merge. The model uses a fourth-order integration routine along the centerline of the effluent plume to trace its position and dilution over time. UDKHDEN can evaluate ambient current directions relative to the diffuser axis ranging from 45° to 135° (Muellenhoff et.al., 1975). UDKHDEN was used in this analysis because of its ability to analyze a variety of discharge angles relative to ambient flow and its' proven reliability of dilution predictions over all anticipated conditions in this analysis. Outfall 056 was the only discharge that used UDKHDEN for the modeling analysis.

The majority of dry weather outfalls at the NNSY discharge either at or very near to the water surface. Most surface discharges can be readily modeled with PDS (Shirazi and Davis, 1974), which is also an EPA-developed and approved model. This model was previously used by CH2M HILL to evaluate the surface discharges for the NNSY.

PDS is an integral model where Gaussian velocity and concentration profiles are assumed in the vertical and horizontal direction. The momentum equation includes both dynamic drag for cross currents and fluid friction at the plume ambient interface. Discharge can be at any horizontal angle relative to the current but the current must be uniform and unstratified. The output from PDS gives plume centerline trajectory, width, depth, and dilution prediction. Provided that model limitations are recognized (e.g., it does not account for boundary effects), PDS provides consistent and reasonable results. PDS was used to model the surface discharges at the NNSY.

Model Input Data

Input data and assumptions for initial dilution modeling were developed primarily from existing available information and documented in previous NNSY mixing zone studies (CH2M HILL, 1996). Data sources included previous studies on the Elizabeth River, regional tide and tidal current tables, National Oceanic and Atmospheric Association (NOAA) navigation charts, and NNSY Discharge Monitoring Reports (DMRs).

Discharges from the NNSY drydock outfalls consist primarily of SWPBFP, stormwater, cooling water, silt washdown after initial draining of the drydock, HVAC and steam condensate. Therefore, the salinity of the discharge water is lower than that of the salinity of the Elizabeth River. Based on monitoring data from 1995 and 1996, the salinity of the water discharged from Outfalls 200, 300, 400, and 500 averages 13 parts per thousand (ppt). The average temperature of discharge water from the drydock outfalls in late summer/early fall based on monitoring data from 2007 to 2009 was 25° C, which is equal to the average late summer/early fall water temperature in the Elizabeth River. The outfalls discharge roughly

perpendicular to the ambient current direction. The key characteristics of the drydock outfalls are summarized in Table 1.

TABLE 1
Drydock Outfall Information

Outfall Number	Drains Drydock(s)	Outfall Diameter	Outfall Invert Elevation (ft)[1]	Pumping Rate (gpm)
200	1,2, and 3	20 in	91.67	1,000 to 4,500
300	3	10 in	91.40	900
400	4	20 in	85.40	5,000
500	8	24 in	92.71	9,500
501	8	12 ft x 16 ft	77.00	ASW 4,100 Pump 15,000

Once-through cooling water that is originally pumped from the Elizabeth River is discharged to Outfall 056. Therefore, the salinity of the discharge from Outfall 056 is assumed to be equal to receiving water salinity. Temperature of the discharge ranges from 24 °C to 31° C in the late summer/early fall, based on DMR data from 2007 to 2009. A constant flow rate 1.11 mgd is pumped to the Elizabeth River through a 6-foot by 4-foot box culvert.

A new ASW system with a maximum flow rate of 4,100 gpm will be installed in the future at Drydock 8 to pump cooling water from vessels hosted in the dock. A new 15,000 gpm pump will also be installed at Outfall 501 to serve as a backup pump to the two existing pumps that currently serve Drydock 8 and discharge at Outfall 500. The Outfall 501 discharge point is approximately 50 to 100 feet from Outfall 500 at Berth 42. The ASW system and 15,000 gpm pump will convey flow to a 12-foot wide by 16-foot deep concrete flume and, based on available design drawings, the invert elevation of the flume is at 77.0 feet which is 16.1 feet below the MLW elevation of 93.08 feet. This outfall was not previously modeled but this discharge configuration was preliminarily evaluated using the PDS model similar to the modeling for the other drydock outfalls above.

Ambient current velocities were obtained from NOAA tidal current predictions for (Elizabeth River-Southern Branch-Berkley Station) and obtained from http://tidesandcurrents.noaa.gov.The currents were verified with information from previous studies (VIMS, 1975; 1981). The mean tidal cycle was assumed for initial dilution modeling. The tidal velocity under mean tidal conditions at the NOAA Berkley Station in the Southern Branch of the Elizabeth River varies from 0 to 0.5 feet per second, fps (NOAA, 2009).

Reasonable worst-case conditions for the receiving water with respect to effluent mixing and dilution were assumed in this analysis. These conditions include a weekly stratified or unstratified salinity regime which is a condition that is typically found in late summer to early fall. Ambient temperature and salinity that typically occur during late summer and early fall were used in the model. Ambient temperature and salinity data were obtained

from previous studies (HydroQual, 1987; 1991; VIMS 1975; 1981), which reported field data from several river surveys near the NNSY discharge locations.

Table 2 summarizes initial dilution model input data and sources for Outfalls 200 through 501 and Outfall 056.

TABLE 2
Summary of Data Sources for the Initial Dilution Modeling

Parameter	Source	Value
Discharge flow	Pump capacity for drydock outfalls reported by NNSY personnel; DMR data minimum flow for Outfall 056	Outfall 200: 1,000 gpm to 4,500 gpm Outfall 300: 900 gpm Outfall 400: 5,000 gpm Outfall 500: 9,500 gpm Outfall 501: 4,100 gpm or 15,000 gpm Outfall 056: 1.11 mgd
Discharge temperature	2007 to 2009 monitoring data average temperature	25° C
Discharge salinity	1995 to 1996 monitoring data	Outfalls 200 to 500: 13 ppt Outfall 501: 20 ppt Outfall 056: 20 ppt
Receiving water depth	2005 hydrographic condition survey	Outfall 200: 41 feet (average) Outfall 300: 39 feet (average) Outfall 400: 41 feet (average) Outfall 500: 45 feet (average) Outfall 501: 45 feet (average) Outfall 056: 45 feet (average)
Ambient current velocity	NOAA tidal current tables (2009)	Varies; 0.0 to 0.5 ft/sec (mean tidal cycle)
Ambient temperature	HydroQual and VIMS reports–typical late summer/early fall conditions	25° C
Ambient salinity	HydroQual and VIMS reports–typical late summer/early fall conditions	20 ppt

Initial Dilution Model Results

Drydock Outfalls

To determine the final dilution for each of the NNSY outfalls which were evaluated, the PDS model was run for each discharge for 12 hourly ambient velocity values representing the velocity over a full mean tidal cycle.

As previously mentioned, PDS was used because these outfalls discharge near the water surface. Outfall 400 is the deepest drydock outfall, located only 7 feet below the MLW surface. The AIZ boundary based on the discharge length scale (DLS) criterion is 22.5 meters (74 feet) for Outfalls 200, 400, and 500 and 13.5 meters (44 feet) for Outfall 300.

PDS assumes that the discharge salinity is equal to the ambient salinity. However, it uses density, which is a function of salinity and temperature, in its calculations. In order to accurately model the lower density of the discharges, the discharge temperature was

increased. The actual discharge density of 13 ppt salinity and a temperature of 25° C is equivalent to the density of 20 ppt salinity and 40° C. Therefore, the PDS model was run with a salinity (ambient and discharge) of 20 ppt and a discharge temperature of 40° C. The heat transfer index option in PDS was set to 'low' to minimize the effect of the artificially high discharge temperature. This technique of adjusting the discharge temperature to simulate a lower density was recommended by one of the co-authors of the PDS model, Dr. Lorin Davis (Professor Emeritus of Mechanical Engineering at Oregon State University).

The results of initial dilution modeling for the 12 hourly tidal velocities are presented in Table 3. The average of the 12 hourly dilution factors is provided at the bottom of the table.

TABLE 3
Initial Dilution Modeling Results for the NNSY Drydock Outfalls

Hour	Ambient Velocity (m/sec)	Outfall Number				
		200		300	400	500
		1,000 gpm	4,500 gpm			
1	0.077	6:1	13:1	15:1	13:1	13:1
2	0.139	11:1	14:1	16:1	14:1	13:1
3	0.154	12:1	14:1	17:1	14:1	13:1
4	0.123	9:1	13:1	16:1	14:1	13:1
5	0.046	5:1	13:1	15:1	13:1	13:1
6	0.000	4:1	12:1	14:1	13:1	13:1
7	0.077	6:1	13:1	15:1	13:1	13:1
8	0.139	11:1	14:1	16:1	14:1	13:1
9	0.154	12:1	14:1	17:1	14:1	13:1
10	0.123	9:1	13:1	16:1	14:1	13:1
11	0.046	5:1	13:1	15:1	13:1	13:1
12	0.000	4:1	12:1	14:1	13:1	13:1
Tidal Cycle Average		**8:1**	**13:1**	**16:1**	**14:1**	**13:1**

In summary, the tidally-averaged dilution factor is 16:1 for Outfall 300, 14:1 for Outfall 400, and 13:1 for Outfall 500. For Outfall 200, the tidally-averaged dilution factor at the new lower flow of 1,000 gpm is 8:1. The model results for Outfall 200 at 4,500 gpm (evaluated during the mixing zone modeling conducted previously) remains unchanged and is a tidally-averaged dilution factor of 13:1. The PDS model output data are provided in Appendix A (bound separately).

Outfall 056

Outfall 056 is a discharge tunnel that is 6 feet wide by 4 feet high and receives cooling water pumped at a continuous rate of 1.11 mgd. The invert of Outfall 056 is 13 feet below MLW. Therefore, the outfall is always submerged and subject to tidal intrusion. Although there is a constant flow pumped through the outfall, the flow rate is relatively small compared to the size of the discharge tunnel. The average calculated velocity of the flow over the entire cross-sectional area of the discharge tunnel for the maximum flow of 1.11 mgd is about 0.07 fps. The velocity would be insufficient to overcome the force of the tidal water. Because the

cooling water is warmer than the ambient, the discharge floats in the upper portion of the discharge tunnel, effectively discharging over a smaller area than the full cross-sectional area of the tunnel. This would produce a higher discharge velocity than the calculated 0.07 fps. This assumption was used in the modeling to allow the exit velocity to be just large enough to realistically allow a discharge against the pressure of the ambient head.

An effluent flow of 1.11 mgd was modeled with UDKHDEN. To determine the final dilution for use in establishing water-quality-based effluent limits, UDKHDEN was run for 12 hourly ambient velocity values representing the velocity over a full mean tidal cycle. The results of initial dilution modeling are presented in Table 4. The average of the 12 hourly dilution factors is shown at the bottom of the table. The AIZ boundary based on the local water depth criterion is 200 feet. For the model cases where the ambient velocity is the highest (hours 2 and 3), the plume is predicted to reach the AIZ boundary. In all other cases modeled where the ambient velocity is lower (zero or near zero), the plume reaches the surface before reaching the AIZ boundary.

Therefore, the dilution values in Table 4 are reported either at the point where the plume reached the water surface or the AIZ boundary under MLW conditions. The UDKHDEN model output for Outfall 056 is provided in Appendix B (bound separately).

TABLE 4
Initial Dilution Modeling Results for NNSY Outfall 056

Hour	Ambient Velocity (m/s)	Average Dilution Factor
1	0.077	61:1
2	0.139	85:1
3	0.154	86:1
4	0.123	92:1
5	0.046	41:1
6	0.000	7:1
7	0.077	61:1
8	0.139	85:1
9	0.154	86:1
10	0.123	92:1
11	0.046	41:1
12	0.000	7:1
Tidal Cycle Average		**62:1**

In summary, the tidal cycle average dilution factor for Outfall 056 at the edge of the AIZ (200 feet) is 62:1.

As stated previously, both the AIZ and the far-field regulatory mixing zone (RMZ) are applicable for Outfall 056, since it is a continuous discharge. The RMZ is applicable to chronic toxicity criteria and associated permit limits. The dilution at the RMZ is also used to adjust the AIZ dilution to determine the effective dilution of continuous discharges in tidally influenced receiving waters. The AIZ dilutions are adjusted based on the results of a farfield dilution model.

The 1996 mixing zone study included farfield modeling evaluation. A detailed description of the farfield modeling assumptions and inputs was provided in the previous mixing zone studies conducted for NNSY (CH2M HILL, 1996). The farfield modeling evaluation concluded that a worst-case tidal variation should result in a variation in concentrations of less than a factor of two. Therefore, as a worst-case scenario, a very conservative estimate of farfield dilution factor at Outfall 056 would be 124:1. This value would only be approached during a very short portion of the tidal period.

Initial dilution models assume that the ambient concentration of a given parameter is zero. This is not true, however, in an estuarine environment such as the Elizabeth River. For the continuous NNSY discharge (Outfall 056), the initial dilution results must be adjusted to account for the ambient concentration as determined by the farfield model. The equation of effective dilution was determined from a mass balance of the ambient and initial mixing zones. The equation is a function of initial and ambient dilutions:

$$Se = [S_o * S_a] / [(S_a + S_o)-1]$$

where:

S_e = Effective dilution
S_o = Initial dilution at the AIZ; and
S_a = Ambient dilution (from PT121 farfield model)

This equation yields an effective dilution somewhat lower than the initial dilution results. For an ambient dilution of 124:1 and an initial dilution of 62:1 for Outfall 056, the effective dilution is 42:1.

Outfall 501

At Outfall 501, a new ASW system will convey ship cooling water at a maximum flow of 4,100 gpm through a 16-inch diameter pipe connected to an existing large concrete flume. This outfall will discharge cooling water from vessels that are hosted in Drydock 8. A new pump will also be connected at Outfall 501 and will convey flow at a constant rate of 15,000 gpm through a 24 inch-diameter pipe connected to the same concrete flume. The new 15,000 gpm pump will serve as a backup pump to the two existing pumps that also serve Drydock 8 and discharge at Outfall 500. The 15,000 gpm pump at Outfall 501 and the 9,500 gpm pumps at Outfall 500 will not operate at the same time.

Based on available design drawings, the concrete flume terminates in a 12-foot wide by 16-foot deep stop gate that can be raised to open the flume for discharge. According to NNSY, the gate is kept open nearly all of the time, and is fully open during discharge. The invert of

the flume is at an elevation of 77.0 feet, which is 16.1 feet below the MLW elevation of 93.08 feet. The top of the flume is just below (within about 1 foot) the MLW elevation.

Because the discharge area of this outfall is extremely large (192 ft^2) relative to the maximum effluent flow rate (15,000 gpm), it will exhibit very low discharge velocities. This type of situation poses a problem for dilution models. Due to the low discharge velocity, this will allow ambient river water to intrude and fill the discharge channel. Without modifying (i.e., decreasing) the discharge area, this situation is difficult to simulate with the available models and will under-predict the dilution that actually occurs.

A preliminary PDS model run was made by modifying the discharge channel dimensions to 12-feet wide by 3-feet deep at an intermediate ambient current velocity (0.077 m/sec). The PDS model run for this case with a flow of 15,000 gpm predicts a dilution factor of about 2.5:1 at a distance of 22.5 meters (74 feet), the approximate distance of the AIZ. Another preliminary PDS model run was made with a flow of 4,100 gpm and the dilution factor was less than 2:1.

The complex situation for this discharge is very similar to those of Outfalls 040 and 100, which will require dye tracer studies to determine dilution at the AIZ. It is possible that a dye tracer study may also be the best and most accurate way to represent the dilution achieved by Outfall 501.

Another possible alternative, which is being investigated by NNSY, would be extend the 16-inch diameter and 24-inch diameter inlet pipes along the invert of the flume to discharge the flow near the end of the stop gate of the flume. This approach would have two distinct advantages over discharge through the 12-ft wide by 16-ft deep flume: 1) discharge through 16-inch diameter and 24-inch diameter pipes would greatly increase the discharge exit velocity to over 10 ft/sec, thereby enhancing nearfield mixing and dilution, and 2) discharging at the bottom of the flume at an invert elevation of 77.0 feet would submerge the outfall to a depth of about 13 feet below MLW rather than at the surface. Along with the increase in port discharge velocity, submerging the outfall would also enhance nearfield mixing by providing more ambient river water for dilution.

The model UDKHDEN was used to evaluate this possible submerged discharge scenario for the future 15,000 gpm flow from the 24-inch diameter pipe and future 4,100 gpm flow from the 16-inch diameter pipe. Key input assumptions for these model cases included a discharge depth of 13 feet and a cooling water discharge temperature of 25° C. All other model inputs listed in Table 2 were used. The modeling results for the submerged 24-inch diameter pipe are summarized in Table 5 and indicate that dilution factors would range from 16:1 (zero current) to 52:1 (maximum current velocity). The tidal cycle average dilution factor over the 12-hour tidal period would be 38:1. The modeling results for the submerged 16-inch diameter pipe are summarized in Table 6 and indicate that dilution factors would range from 17:1 (zero current) to 73:1 (maximum current velocity). The tidal cycle average dilution factor over the 12-hour tidal period would be 52:1. As expected, the dilutions provided by this discharge alternative have significantly improved results over discharge through the flume itself.

TABLE 5
Initial Dilution Modeling Results Using UDKHDEN for Submerged Discharge of 24-inch Pipe for Drydock Sump Pump at NNSY Outfall 501

Hour	Ambient Velocity (m/sec)	Average Dilution
1	0.077	36:1
2	0.139	49:1
3	0.154	52:1
4	0.123	46:1
5	0.046	28:1
6	0.000	16:1
7	0.077	36:1
8	0.139	49:1
9	0.154	52:1
10	0.123	46:1
11	0.046	28:1
12	0.000	16:1
Tidal Cycle Average		**38:1**

TABLE 6
Initial Dilution Modeling Results Using UDKHDEN for Submerged Discharge of 16-inch Pipe for ASW System at NNSY Outfall 501

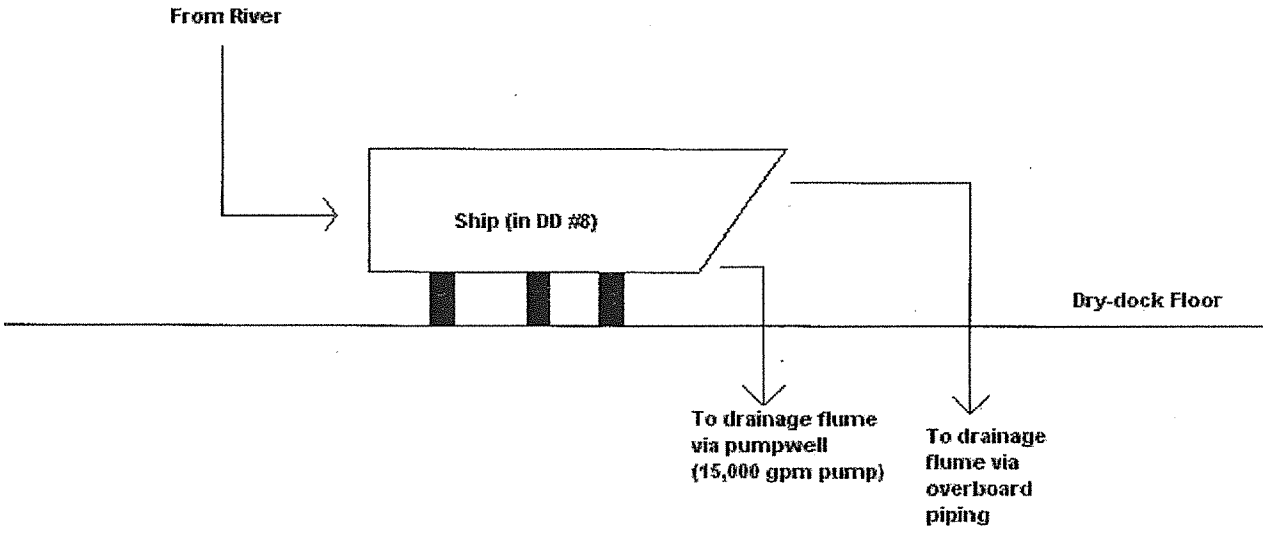
Hour	Ambient Velocity (m/sec)	Average Dilution
1	0.077	49:1
2	0.139	69:1
3	0.154	73:1
4	0.123	65:1
5	0.046	36:1
6	0.000	17:1
7	0.077	49:1
8	0.139	69:1
9	0.154	73:1
10	0.123	65:1
11	0.046	36:1
12	0.000	17:1
Tidal Cycle Average		**52:1**

Conclusions

The following summarizes the results of the modeling evaluation conducted for the NNSY outfalls:

- **Outfall 200**—The lowest potential flow for this discharge is 1,000 gpm from the pump for Drydock 2. The modeling results indicate that the tidal cycle average dilution under this flow condition is 8:1. The previous model results for the maximum discharge flow of 4,500 gpm from Drydock 3 remain unchanged with a 13:1 dilution factor at the AIZ. The permit may need to be modified to reflect different dilution factors for Outfall 200 depending on which drydock and pump(s) are discharging.
- **Outfall 300**—Since the discharge has a smaller pipe diameter of 10 inches vs. 12 inches modeled previously, the new model predictions for Outfall 300 indicate slightly higher dilution values. The tidal cycle average dilution increased from 12:1 to 16:1.
- **Outfall 400**—The discharge flow rate slightly increased from 4,500 gpm to 5,000 gpm, so the new model predictions for Outfall 400 indicate slightly higher dilution values due to an increase in discharge velocity. The tidal cycle average dilution increased from 13:1 to 14:1.
- **Outfall 500**— Since the outfall pipe diameter increased from 20 inches to 24 inches, this discharge was remodeled at a flow of 9,500 gpm. The modeling predictions indicate that the tidal cycle average dilution under this flow condition will decrease from 17:1 to 13:1.
- **Outfall 056**— The discharge flow rate decreased substantially and new (smaller) box culvert dimensions were used, so the UDKHDEN modeling predictions indicate that the tidal cycle average dilution will substantially increase from 27:1 to 62:1. Based on farfield modeling results reported in the previous mixing zone studies, an effective dilution of 42:1 has been calculated for this discharge.
- **Outfall 501**—A preliminary PDS model run at the proposed maximum flow of 15,000 gpm for the drydock sump pump indicates that the dilution achieved would be quite low (2:1 or less). A possible option to discharge flow through submerged outfall pipes located at the bottom of the flume near the end would provide significantly higher dilution with tidal cycle average values of 38:1 for the 24-inch diameter pipe from the drydock sump pump and 52:1 for the 16-inch diameter pipe from the ASW system. However, if the submerged pipe discharge option is not possible, a dye tracer study may be needed to determine the dilution factor in lieu of dilution modeling.

Proposed Outfall
501 ASW Cooling
Water Flow Diagram



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Appendix A
PDS Model Output

Appendix A is provided in a separate binder.

Appendix B
UDKHDEN Model Output

Appendix B is provided in a separate binder.

Mixing Zone Study for the Norfolk Naval Shipyard Outfalls 040 and 100 Portsmouth, Virginia

Prepared for

Department of the Navy
Naval Facilities Engineering Command
Mid-Atlantic

Norfolk, Virginia

FEBRUARY 2010

Contents

Figures

Acronyms and Abbreviations

AIZ	allocated impact zone
CTD	conductivity-temperature-depth
°F	degrees Fahrenheit
DAF	dissolved aqueous flotation
DLS	discharge length scale
fps	feet per second
gpm	gallons per minute
IWTP	industrial water treatment plant
kt	knots
LWD	local water depth
mgd	million gallons per day
MHW	mean high water
mL/min	milliliters per minute
MLW	mean low water
NNSY	Norfolk Naval Shipyard
ppb	parts per billion
QA	quality assurance
QC	quality control
RDF	refuse-derived fuel
RMZ	regulatory mixing zone
SCUFA	
TSD	Technical Support Document for Water Quality-based Toxics Control
USEPA	United States Environmental Protection Agency
VDEQ	Virginia Department of Environmental Quality
VPDES	Virginia Pollutant Discharge Elimination System

SECTION 1

Introduction

Norfolk Naval Shipyard (NNSY) is located in Portsmouth, Virginia along the western shore of the Southern Branch of the Elizabeth River (Figure 1-1). Activities at the NNSY include construction, conversion, overhaul, repair, alteration, dry docking, and outfitting of naval ships. Discharges from the NNSY are regulated by a Virginia Pollutant Discharge Elimination System (VPDES) permit (No. VA0005215), which was last issued on April 24, 2005. NNSY has over 100 permitted outfalls, the majority of which are stormwater discharges.

NNSY has previously conducted mixing zone studies for their four drydocks (Outfalls 200, 300, 400, and 500), cooling water discharges from a power plant (Outfall 056), and discharges from their two industrial wastewater treatment plants (IWTPs) (Outfalls 100 and 040). These mixing zones studies determined dilution factors based on dye studies, near-field modeling, and far-field modeling conducted by CH2M HILL in 1996 and 1999. The methods and results of these studies were accepted by the Virginia Department of Environmental Quality (VDEQ) and the results were subsequently used by VDEQ to evaluate and/or establish NPDES permit limitations for the NNSY.

The NNSY mixing zones are presently being re-evaluated by CH2M HILL on an outfall by outfall basis to provide sufficient information to determine if the dilution factors established for the facility's discharges by previously approved effluent mixing zone models remain valid. This report presents the results of mixing zone (dye tracer) studies which were conducted for Outfalls 040 and 100.

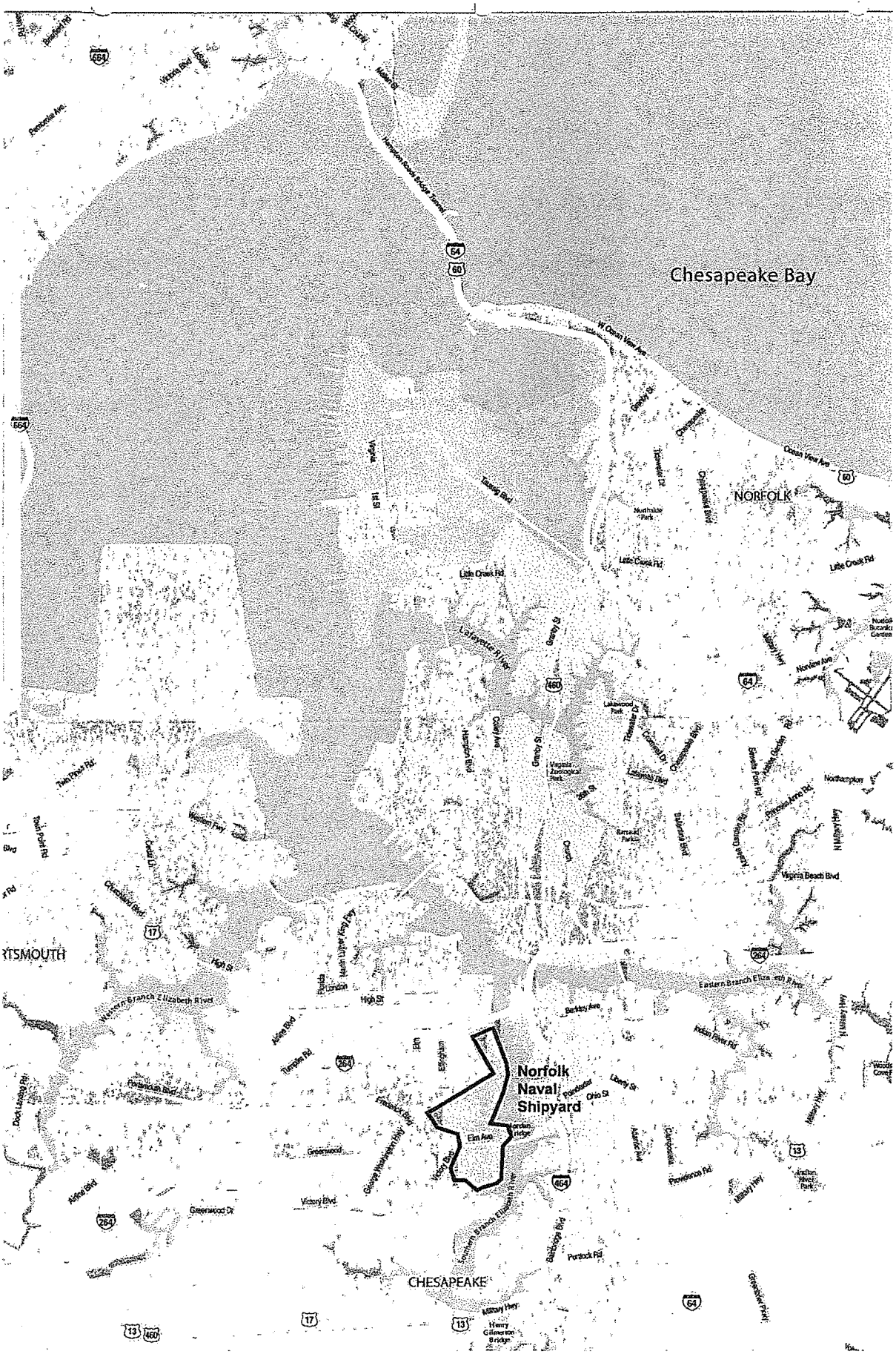

FIGURE 1-1
Location of Norfolk Naval Shipyard
NNSY Mixing Zone Study

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SECTION 2

Study Area Description

NNSY is located on the Southern Branch of the Elizabeth River in eastern Virginia. The Elizabeth River is a tidally influenced branch of the James River which, in turn, is a branch of Chesapeake Bay.

The Elizabeth River watershed has an area of approximately 300 square miles. Freshwater input to the river is generally low and consists mainly of stormwater runoff and drainage from the Dismal Swamp (VIMS, 1981). When freshwater flows are low, the tidal action in the river is normally sufficient to produce vertically well-mixed and laterally homogeneous waters; but when stratification does exist, a non-tidal circulation occurs that enhances flushing (VIMS, 1975). Therefore, the worst-case conditions for flushing occur when the river is vertically well-mixed. This typically occurs in the late summer or early fall when freshwater flows are at a minimum.

The water depth in the Southern Branch Elizabeth River varies from several feet near the banks to over 40 feet in the navigation channel at mean low water (MLW). The deeper portions of the river are routinely dredged for shipping traffic. In the area of Outfall 100, the average water depth is about 2 to 3 feet at MLW. For Outfall 040, the average depth is about 5 to 6 feet immediately offshore of the discharge.

SECTION 3

Mixing Zone Analysis

3.1 Study Objective

The objective of the mixing zone studies was to determine and confirm the amount of dilution that occurs for discharges from Outfalls 040 and 100 into the Elizabeth River. For Outfall 100, the objective was to document the changes in plant flows from 150 gallons per minute (gpm) to a new flow of 300 gpm; for Outfall 040, it was to document the dry weather baseflow in the pipe to Outfall 040 that has increased from 0.025 mgd to 0.040 mgd, the plant flow has increased from 0.025 mgd to 0.040 mgd and changed from continuous to intermittent flows. The study will generate dilution values for use in calculating and verifying water-quality-based permit limits. This field dye study was conducted in accordance with the protocols that were previously developed in 1996 and 1999 to determine the dilution factor at the edge of the allocated impact zones associated with the discharges from Outfalls 040 and 100.

3.2 Regulatory Framework

Water quality standards are established by the Commonwealth of Virginia to protect the designated uses of a receiving water. Acute and chronic water quality criteria are applied to protect aquatic organisms from toxic effects of specific chemicals or whole effluent. The VDEQ describes procedures to establish permit limits designed to meet water quality standards in Guidance Memorandum No. 00-2011 (VDEQ, 2000).

To derive water-quality-based permit limits based on acute and chronic criteria, VDEQ uses a default limit of the more stringent of either twice the acute saltwater criterion or 50 times the chronic saltwater criterion for estuarine conditions.

VDEQ and the United States Environmental Protection Agency (USEPA) allow limited areas in receiving waters where the effluent is not required to meet the acute or chronic toxicity criteria. These areas are called the allocated impact zone (AIZ) and the regulatory mixing zone (RMZ). If a discharger can provide sufficient demonstration of rapid mixing within the AIZ and the RMZ, VDEQ could allow dilution-based permit limits higher than the default values discussed above.

According to the Virginia Water Quality Standards, 9 VAC 25-260 (August 2009), the dimensions of an RMZ are limited to:

- No more than one-half of the width of the receiving water, nor more than one-third of the cross-sectional area of the receiving water.
- A distance downstream of 5 times the width of the receiving water.

Alternatively, on a case-by-case basis, VDEQ may waive the above limitations if acceptable demonstration of the actual RMZ boundary is provided. If sufficient data are available, a

hydrodynamic model can be used to define the RMZ and to determine the amount of dilution achieved.

The AIZ is a small region inside the RMZ where momentum and buoyancy of the discharge dominate the mixing process. The Virginia Water Quality Standards do not provide specific language on the requirements for an AIZ. Specific guidance is provided by the USEPA in its Technical Support Document for Water Quality-based Toxics Control (TSD), which defines the AIZ size and lists appropriate models to demonstrate mixing within the AIZ.

Acute water quality criteria, both chemical-specific and whole effluent toxicity, must be met at the edge of the defined AIZ. The size of the AIZ is dependent upon the discharge velocity. If the velocity is less than 10 feet per second (fps), which is true in the case for both Outfalls 040 and 100, the AIZ is *the most restrictive* of any of the following (USEPA, 1991):

- 10 percent of the distance from the edge of the outfall structure to the edge of the RMZ in any spatial direction
- 50 times the discharge length scale (DLS); the DLS is the square root of the cross-sectional area of the discharge outlet in any horizontal direction from any discharge outlet
- 5 times the local water depth in any horizontal direction from any discharge outlet

If the discharge exit velocity exceeds 10 fps, only the second criterion (50 times the DLS) applies. However, this is not the case for either of the NNSY outfalls which are evaluated in this mixing zone study.

To confirm the appropriate AIZ distances for use in this mixing zone study, both local water depth (LWD) and discharge pipe diameter for both Outfalls 040 and 100 were field-verified. The pipe diameters were measured at or near MLW and confirmed to be 72 inches and 30 inches for Outfalls 100 and 040, respectively.

Under MLW conditions, the LWD for Outfall 100 is 3 feet, which confirms previous measurements from the 1999 Mixing Zone Study (CH2M HILL, 1999). The LWD for Outfall 040 is 6 feet, also confirming the measurements from the 1996 Mixing Zone Study (CH2M HILL, 1996). Therefore, based on the LWD criteria listed above, the AIZ boundary distances for Outfalls 100 and 040 are assumed to be 15 feet and 30 feet, respectively.

3.3 Discharge Characteristics

3.3.1 Outfall 100

Outfall 100 is a 72-inch diameter concrete pipe that conveys stormwater runoff from the areas surrounding the Southeastern Public Service Authority Refuse-derived Fuel (RDF) Plant and NNSY areas surrounding the Centralized Pierside Pretreatment Unit which has six dissolved aqueous flotation (DAF) treatment units. Located internally to Outfall 100 are two separate discharges identified as Outfalls 101 and 102 located outside NNSY. Outfall 101 is associated with the RDF settling ponds and Outfall 102 drains stormwater runoff from a bermed potable water storage area. The permit allows the discharge of potable water from these tanks when they are drained. The DAF units treat ship bilge water and discharge

to the Outfall 100 72-inch pipe. Figure 3-1 shows the location of the outfall and the adjacent receiving water.

With the use of Outfall 100, NNSY has the capability to discharge from all six DAF units at 50 gpm each. The previous dye study was based on operation of three DAF units with a total flow of 150 gpm. The new flow under evaluation is approximately 300 gpm (i.e., with all six DAF units operating).

Outfall 100 is partially submerged under mean high water (MHW) conditions and exposed under low water conditions. Under certain tidal conditions, some mixing will occur in the outfall pipe even before discharge to the river. Outfall 100 discharges from the shoreline at the river surface. The dry weather discharges from Outfall 100 will vary from freshwater to a freshwater/saltwater mix.

Although previous studies concluded that worst-case conditions for flushing occur when the river is vertically well-mixed (VIMS, 1975; CH2M HILL, 1996; VDEQ, 1996), the dry weather discharge from Outfall 100 is a buoyant surface discharge that will float over the receiving water. Thus, in terms of mixing, receiving water stratification is not an issue. Further, the shallow water depths in the vicinity of the outfall are another reason why receiving water stratification is not a significant issue.

3.3.2 Outfall 040

Outfall 040 is a 30-inch-diameter concrete pipe that currently discharges stormwater from the City of Portsmouth, stormwater runoff from NNSY including a bermed tank area, intermittent effluent from an IWTP, and intermittent flows from drydocks 6 and 7. This outfall discharges to the Southern Branch of the Elizabeth River between Drydocks 3 and 6. The intermittent discharge from the IWTP is designated as Outfall 401. Figure 3-1 shows the location of Outfall 040 and the adjacent receiving water.

Dry weather baseflow in the pipe to Outfall 040 has increased from 0.025 mgd to 0.040 mgd. Also, current flow for Outfall 40 (IWTP) is now 0.040 mgd on an intermittent basis, compared to a continuous flow of 0.025 mgd that was occurring during the 1996 mixing zone study. In the previous study report, it was recognized that actual operation had changed to a batch discharge at 0.144 mgd subsequent to completion of the dye study. However, it was concluded in the 1996 Mixing Zone Study that this change would not substantially affect the dilution determination for this outfall.

The increased baseflow will increase the internal dilution that occurs in the pipe, although the exact same increase in the IWTP flow will directly counterbalance that effect. The increase in the combined flow will lead to slightly higher discharge velocity from the stormwater pipe but may also potentially counteract the higher plume volume within the AIZ. Additionally, flows from Drydocks 6 and 7 have been re-routed from Outfall 400 to Outfall 040. Drydocks 6 and 7 flows include stormwater discharges, groundwater leakage, and discharge intermittently at a rate of 500 gpm.

The pipe outfall is located underneath a pier and is flush along the concrete bulkhead. With the exception of the crown of the pipe (i.e., upper 3 to 4 inches), the outfall is submerged just under the water surface at MLW conditions. The LWD in the vicinity of this outfall is approximately 6 feet.

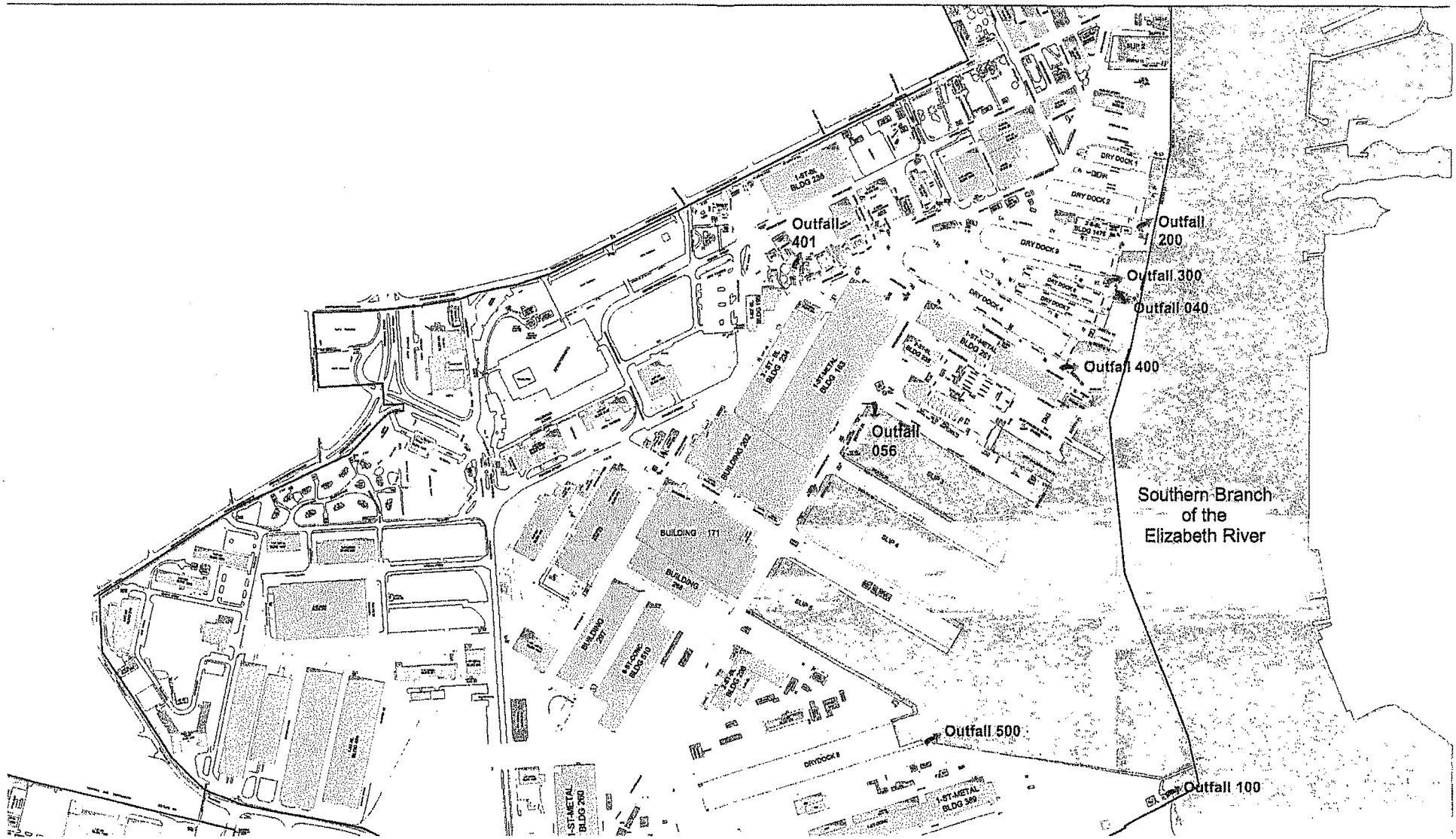


FIGURE 3-1
Outfall Locations
NNSY Mixing Zone Study

CH2MHILL

ES120205212025WDC

SECTION 4

Study Approach

The approach used to conduct the mixing zone studies for Outfalls 100 and 040 involved the collection of site-specific field measurements and field-measured dilutions during ebb tide and low slack water conditions in the Elizabeth River. This section discusses the equipment, methods, and measurements associated with monitoring the dye concentration in the effluent and receiving water.

The tidal hydrographs for the Elizabeth River at Norfolk during the field study period of performance are shown below in Figure 4-1. The studies were designed to take place when tidally-induced flow reversals may occur at the outfall sites.

4.1 Methodology

The outfall mixing zone studies were conducted over a 5-day period during the week of November 16, 2009. Field data collections included the following elements:

- Two mixing zone (dye tracer) studies.
- Observations and documentation of conditions at the allocated impact zone boundaries for each of the discharges.
- Measurements of water depths and water column physical characteristics (e.g., temperature, conductivity, turbidity) in the vicinity of each of the discharges.

The details of the field measurements at the NNSY outfall sites are as follows:

- The first and third field days included equipment mobilization and staging activities, dye injection setup and testing, field instrument calibration, and site-specific physical measurements.
- The dye tracer study for Outfall 100 was performed on November 17, 2009 and the dye tracer study for Outfall 040 was performed on November 19, 2009. These studies involved metered dye injection into the outfalls, initial dye concentration measurements from shoreline manholes, and water column measurements of dye concentration, temperature, conductivity, and turbidity from a work boat.
- During the field study periods—primarily during ebb tide and low slack water conditions—measurements of the dye concentrations were recorded at numerous sampling sites at the existing AIZ and other distances. These field data collections were used to define the range of effluent concentrations (e.g., dilutions) at the AIZ boundaries for each outfall.
- The fifth day of the field studies involved the retrieval and download of deployed instruments, post-study instrument calibrations, and equipment demobilization activities.

The following sections provide additional details of the field instruments and calibration procedures.

4.1.1 Field Instruments and Calibration

Instruments and equipment used for the field study are listed in Table 4-1. A three-person scientific staff was used to deploy instruments, setup equipment, record data, and perform the sampling activities. A 12-foot jon boat was used by staff to help perform the outfall dye measurements at Outfalls 040 and 100.

Measurements of dye concentration in both effluent and receiving water were conducted using Turner Designs SCUFA submersible fluorometers. These instruments measure and record dye fluorescence and turbidity. The SCUFA instrument allows the user to conduct tracer studies without the requirement of a pump or water sample collection and allows for the analysis of data in real time. Instrument calibration is conducted in the field using a laptop computer and the software provided by the instrument manufacturer (SCUFAsoft version 2.11).

TABLE 4-1
Instrumentation Used for the NNSY Mixing Zone Studies for Outfalls 100 and 040

Equipment Item	Purpose	No. of Units	Accuracy Standard
SeaBird SBE-19Plus CTD (water quality instrument)	Measure and record pressure (depth), temperature, conductivity, fluorescence and turbidity	1	Conductivity: ±0.1 mS/m Temperature: ±0.1°C
Turner Designs, Inc. SCUFA (submersible fluorometer)	Measure and record Rhodamine WT fluorescence and turbidity (one unit attached to SeaBird, one deployed in outfall to measure initial dye concentrations)	3	Rhodamine WT dye: ±0.2 ppb
Masterflex pumps	Flow metering of dye injection	2	Rhodamine WT dye: +/- 1.0 mL/min
Laptop computer	Real-time data logging with Seabird Instrument; and set up and download SCUFA fluorometers	2	N/A
Masterflex pumps	Flow metering of effluent for initial dye concentrations	2	N/A
Laser rangefinder	Measure distances to bank and from sampling location to outfall	1	±0.5 ft (for distances in excess of 10 yards)

°C = degrees Celsius; ft = foot, feet; mS/m = microsiemens per meter; N/A = not applicable; ppb = parts per billion;

The SCUFA is an ideal instrument for studies using Rhodamine WT dye because it has automatic temperature compensation and the ability to simultaneously measure ambient turbidity. The temperature compensation feature eliminates errors that can arise from changing water temperatures.

However, turbidity can be a common interference with this instrument. Although the SCUFA optics are effective at limiting this interference, turbid waters can cause some false

signal. Simultaneous turbidity measurements allow the user to analyze the Rhodamine and turbidity data for a correlation that may indicate this interference and which facilitates the identification of potential data outliers.

Equipment Calibration

Each instrument was tested and calibrated prior to each mixing zone study to assess whether instrument drift had occurred. The SCUFAs were used for dye concentration monitoring in the outfall pipe to record initial dye concentration prior to discharge to the receiving water. To calibrate and test the SCUFA fluorometers, effluent/dye and receiving water/dye solutions (standards) of incrementally diluted dye concentrations were prepared. The effluent standards which were prepared using 20 percent stock Rhodamine WT liquid dye added to effluent from both the DAF and IWTP and were prepared in concentrations of 100 and 200 parts per billion (ppb). The receiving water standards were prepared using 20 percent stock Rhodamine WT liquid dye added to Elizabeth River site water and were prepared in concentrations of 10, 25, and 100 ppb.

Calibration of the SCUFAs involves a two-step process: initial calibration set-up is based on the manufacturer's recommended procedure and detailed calibration using a dye standard that is about 50 percent of the anticipated full range. The fluorometers were set up and initially calibrated using 100 percent effluent and 100 percent receiving water as instrument blanks and effluent/dye (i.e., 100 ppb concentration) and receiving water/dye (i.e., 25 ppb) standards as the primary calibration solutions.

Following the initial calibration, pre- and post-study calibrations were performed using a range of dye standards of known dye concentration. The same lot of standards was used for both pre- and post-study calibration checks. The instrument's automatic temperature compensation mode (which was turned on) was used to account for variations in dye fluorescence with temperature.

The calibration data--observed dye concentration versus actual (measured) dye concentration--were used to correct the readings of the initially calibrated instrument. The calibration relationship is linear within the range of standards used, with minimal offset and virtually no drift was observed during the study. The SCUFA calibration was verified immediately upon completion of the study. The pre- and post-study fluorometer calibration data indicate that only a minor post-study calibration correction was necessary.

4.1.2 Dye Injection—Outfall 100

Dye was injected directly into manhole D3452 leading to the outfall pipe at a rate designed to keep the initial dye concentrations as constant as possible. Initial dye samples were recorded using a SCUFA in the effluent flow in the furthest downstream manhole (D2363) in the drainage system to independently determine the concentrations in the effluent stream prior to discharge. The locations of the dye injection manhole and the furthest downstream manhole are shown in Figure 4-2. Two peristaltic pumps—one primary, one backup—were used to pump effluent out of manhole D2363 at approximately 1,400 milliliters per minute (mL/min) and into an enclosed container that housed the SCUFA for initial effluent dye readings. The effluent SCUFA was set up to record one reading of dye concentration and effluent turbidity every minute.

Due to the effects of tidal influence and the uncertainty regarding volumes of stormwater added to the DAF effluent, it was not possible to accurately calculate the travel time in the pipe (i.e., from the dye injection point to the river). The dye injection commenced over 3 hours in advance of the planned sampling start time to allow for sufficient time to elapse for the dye to travel through the outfall and to be present in the effluent plume in the receiving water. This proved to be an adequate period of time as dye was clearly present at the commencement of the receiving water dye measurements.

The dye injection rate was calculated by assuming a maximum effluent flow of 0.42 mgd (300 gpm), a maximum desired (measureable) dilution ratio of approximately 100:1, and a target effluent concentration of dye of 200 ppb. The resulting dye injection rate of 0.227 mL/min for an effluent flow of 0.42 mgd was considered too low and proved unattainable with the available equipment. This was overcome by injecting a pre-diluted 1 percent dye solution which had the effect of increasing the dye injection rate by a factor of 100 to a rate of 22.9 mL/min. A target injection rate of 22 mL/min was therefore established in order to facilitate proper calibration of the injection pumps.

Both the primary and the back-up injection pumps were calibrated to the 22 ml/min target as well as lower injection rates in anticipation of flows below 0.42 mgd. However, due to tidal influence, background stormwater infiltration, and possible unknown discharge upstream of the DAF treatment facility, it was necessary to increase the dye injection rate to 57 ml/min in order to reach the target initial dye concentration of 200 ppb. This adjustment resulted in an average initial dye concentration of about 230 ppb in the effluent during the field dye study for Outfall 100.

4.1.3 Dye Injection—Outfall 040

Dye was injected into manhole D685 adjacent to the IWTP and leading to the outfall pipe at a rate designed to keep the initial dye concentrations as constant as possible. Initial dye samples were recorded using a SCUFA deployed in the effluent flow at the furthest downstream manhole (D579) in the drainage system, located between Drydocks 3 and 6, to independently determine the concentrations in the effluent stream prior to discharge. The locations of the dye injection manhole and the furthest downstream manhole are shown in Figure 4-3.

Due to the effects of tidal influence and the uncertainty regarding volumes of stormwater added to the IWTP effluent, it was not possible to accurately calculate travel time in the pipe (i.e., from the injection point to the river). The dye injection commenced over 7 hours in advance of the planned sampling start time to allow for sufficient time to elapse for the dye to travel through the outfall and to be present in the effluent plume in the receiving water. This proved to be an adequate period of time as dye was present at the commencement of the receiving water dye measurements.

The dye injection rate was calculated by assuming an effluent flow of 0.086 mgd (60 gpm), a maximum measureable dilution ratio of approximately 100:1, and a target effluent concentration of dye of 200 ppb. The resulting dye injection rate of 0.045 mL/min (at an effluent flow of 0.086 mgd) was considered to be too low and unattainable with the available equipment. This was overcome by injecting a pre-diluted 0.5 percent dye solution which had the effect of increasing the dye injection rate by a factor of 200 to a rate of 9 mL/min. A target injection rate of 9 mL/min was therefore established in order to facilitate

calibration of the injection pumps. Both the primary and the back-up injection pumps were calibrated to the 9 mL/min target as well as lower injection rates in anticipation of flows below 0.086 mgd.

For both outfalls, the initial sampling location was sited a distance sufficiently downstream from the injection point to allow the dye to become completely mixed with the effluent before sampling occurred.

4.1.4 Dye Study Field Methods

Dye concentrations were measured at pre-selected points in the Elizabeth River using a submersible fluorometer (SCUFA) attached to a SeaBird Conductivity-Temperature-Depth (CTD) Instrument. To replicate the methodology followed during the previous two mixing zone studies, the sampling locations were marked with buoys at measured distances in concentric semicircles. For Outfall 100, these semi-circles were placed at distances of 15 feet (the AIZ), 25 feet, and 50 feet from the outfall terminus; for Outfall 040, the semi-circles were placed at distances of 30 feet, 50 feet (the AIZ), and 60 feet from the outfall terminus.

As stated previously, dye concentrations were also measured at the furthest manhole downstream of the injection point to obtain measurements of the dye concentration prior to discharge in the Elizabeth River. These measurements were compared to the dye concentrations at the various points in the receiving water in order to calculate dilution at each sampling location.

The Field Dye Study for Outfall 100 was conducted over a 3-½ hour period on November 17, 2009 (12:00 p.m. to 3:30 p.m.) to obtain field measurements during an ebb tidal cycle. Low slack water conditions were captured during the sampling because this condition typically represents the most conservative mixing conditions in the river because there is typically no ambient current to enhance mixing. At Outfall 040, there were several logistical challenges associated with maneuvering under the pier (i.e., moving between pilings, under pier supports, and around a large ship). Ultimately, this limited the field sampling activities to approximately a two-hour period on November 19, 2009 (4:45 p.m. to 6:40 p.m.). The sampling for Outfall 040 was conducted at late ebb tide, throughout the low slack water, and into early flood tide.

Outfall 100

The dye injection was started on November 17, 2009 at 7:57 a.m. The DAF flow rate at the time was approximately 270 gpm, or 0.38 mgd. The initial injection rate was set at 22 mL/min. There were no known effluent flow alterations, bypasses, or storage that occurred during the dye tracer study, with the exception of an unknown intermittent discharge upstream of the DAF facility from 1:00 p.m. to 3:00 p.m. Ambient conditions encountered on the day of the mixing study were air temperatures in the mid-60s (degrees Fahrenheit [°F]), light E/NE winds (5 to 10 knots [kt]), moderate water surface conditions (6 to 12 inch wind chop), and the Elizabeth River water was generally turbid. The dye injection was stopped at approximately 3:45 pm.

Outfall 040

The dye injection was started at on November 19, 2009 at 9:25 a.m. The IWTP flow rate at the time was approximately 63.3 gpm (0.091 mgd) and the initial injection rate was set at

9.4 mL/min. There were no known effluent flow alterations, bypasses, or storage that occurred during the dye tracer study. Ambient conditions encountered on the day of the mixing study were air temperatures in the mid 60s (°F), very light N/NE winds (less than 5 kt), and calm water surface conditions (less than 6 inch surface chop). The water clarity of the Elizabeth River was good (i.e., non-turbid). The dye injection was stopped at approximately 7 pm.

It is also worth noting that a large Nor'easter storm occurred just days prior to the mixing zone study (from November 11 to November 13, 2009) and may have contributed to the elevated ambient turbidity which was observed in the Elizabeth River.

4.1.5 Dye Study Observations

Sampling and observations during the previous dye studies for both Outfall 100 and Outfall 040 (CH2M HILL, 1996; CH2M HILL, 1999) found that the critical condition for NNSY discharges occurs during ebb tide. During the flood tide, when the tide transitions from low water to high water, more dense (brackish) water from the river penetrates the outfall and prevents less dense fresh effluent from being discharged. This causes the effluent to build up within the pipe until high slack tide. Once the tide begins to recede, the pre-diluted mixture of effluent/dye and river water in the pipes were discharged through the outfalls. This condition was determined to be the critical condition for dye measurements and is the primary reason that these mixing zone studies were planned to collect measurements throughout only an ebb tide and at low slack water.

4.2 Quality Assurance/Quality Control

The quality assurance (QA)/quality control (QC) measures applied followed engineering standards for data collection, calibration, and verification methods to ensure the outfall dilution performance study provided high quality and verifiable data. The QA/QC goals and measures for each of the key study elements are defined below:

1. **Initial Dye Injection and Concentrations**

- **QA Goal**—Provide known and verifiable dye injection rates and initial dye concentrations.
- **QC Measures**—Dye injection pumps and tubing systems were calibrated twice and tested to confirm the dye delivery rates. Duplicate injection pumps and tubing systems were set up as a contingency against sudden failure of one system. Effluent dye measurements were recorded every minute during the field sampling period. These initial dye concentration data provide an accurate measure of the tracer dye concentration immediately before discharge to the river.

2. **Dye Measurements**

- **QA Goal**—Provide verifiable equipment calibration with pre- and post-study calibrations of the fluorometer and temperature instruments.
- **QC Measures**—The calibration record for each instrument was recorded, and calibrations were within the manufacturer's acceptable tolerances. Dye standards were prepared using effluent, background river water and volumetric glassware. The SCUFA

fluorometers were set up and calibrated within their range of linear readings, before and immediately following the dye studies. Variance in the post-study calibration from the pre-study calibration was corrected in the field measurements data.

3. **Instrument & Equipment Redundancy**

- **QA Goal**—Provide equipment redundancy (backup equipment) for all key instruments.
- **QC Measures**—Redundant or backup instruments were prepared and held in standby for the fluorometers, injection pumps, and the laptop computer. Backup water sampling pumps were available in case of instrument failure, but were not used.

4. **4. Field Study Planning**

- **QA Goal**—Implement pre-study planning and organization to clarify site-specific conditions and plan for efficient and uninterrupted field work.
- **QC Measures**—Calibration methods for each of the key instruments used in the studies are briefly described below.
  - **Fluorometers**—All fluorometers were calibrated according to the manufacturer's specifications. Dye concentration solution standards were prepared with the dye used in the study and background river water, collected from the river study sites prior to the dye studies. Fluorometers were calibrated prior to use in the field and immediately following the dye study. Calibration curves (dye standard concentration versus dye reading by instrument) were developed both prior to the field study and after the field study. The post-study calibration curve was compared to the pre-study calibration curve data, to assess instrument drift. Both calibration curves were used to correct the observed dye concentrations and dilutions.
  - **Conductivity-Temperature-Depth (CTD) Instrument**—The CTD had been calibrated to the manufacturer's specifications before conducting the dye study. Calibration results were used during data reduction and calculation of the water column density structure.

4.3 Data Analysis

The dilution in the receiving water was calculated using the following equation:

$$D = \frac{Ce}{Cm}$$

where:

D = instantaneous dilution
C_e = concentration of dye measured in the effluent
C_m = concentration of dye measured in the receiving water

The post-study calibration check for the receiving water SCUFA resulted in a correction using simple linear relation developed from the pre- and post-study calibration data. The SCUFA data for each profile were imported into an Excel spreadsheet and the calibration correction was applied. Instantaneous minimum dilutions were calculated for every

corrected concentration greater than zero. All of these dilutions were then used to calculate a *depth-averaged* dilution value at each sampling location. The approach using depth-averaged dilution was approved by DEQ in previous mixing zone studies. The tabular results of the field measurements and dilution calculations are provided in Appendices A and B.

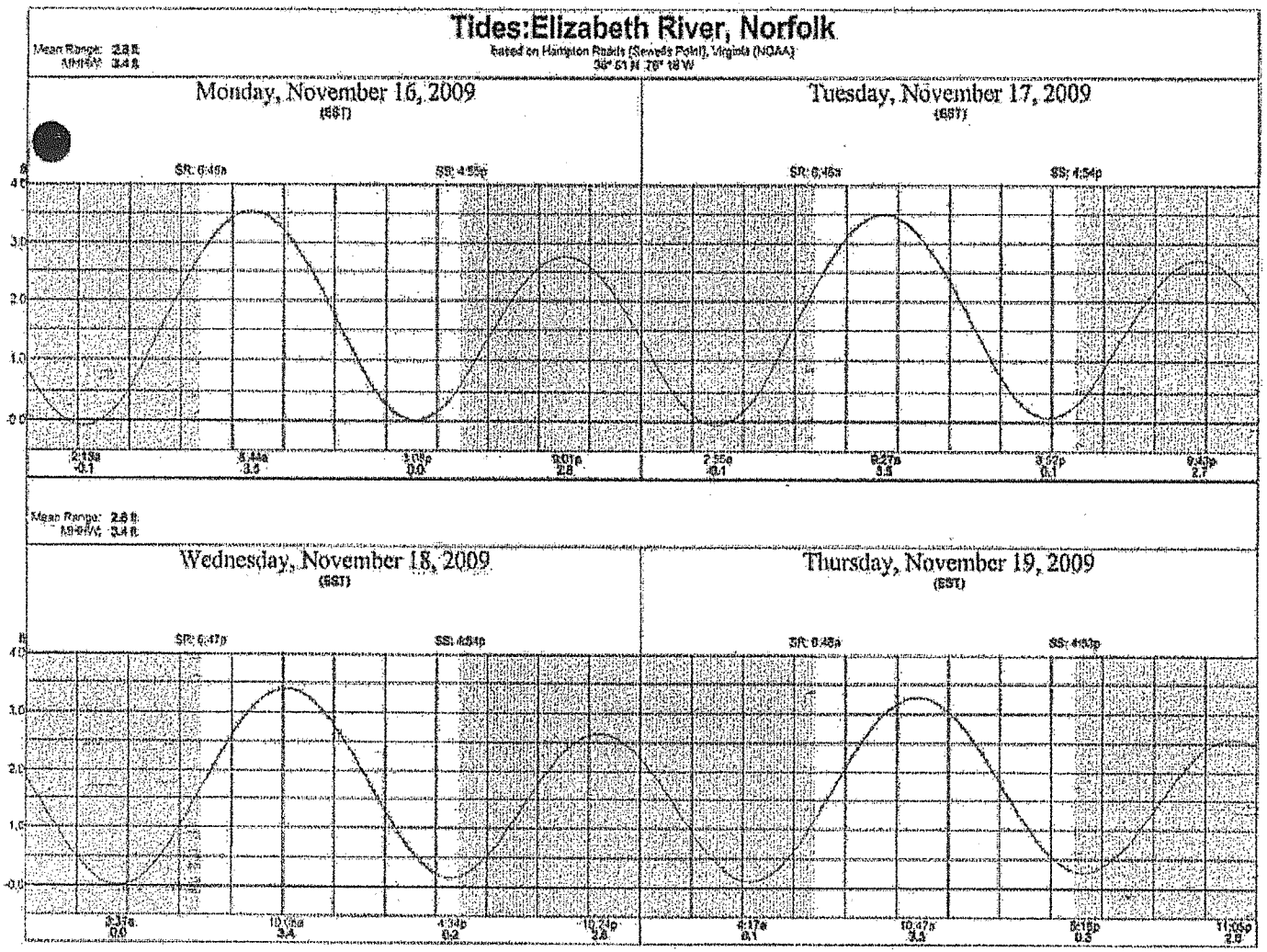
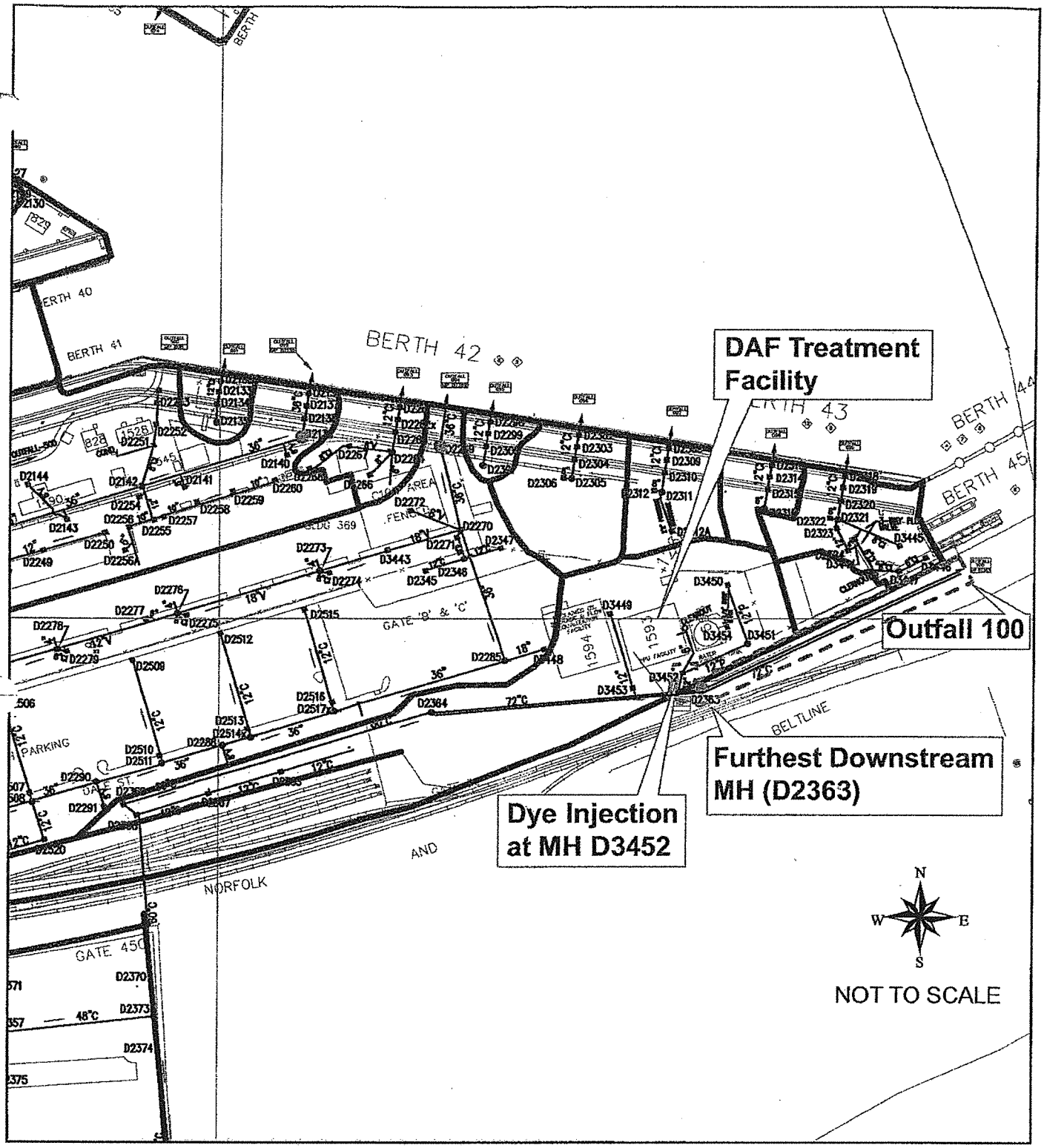


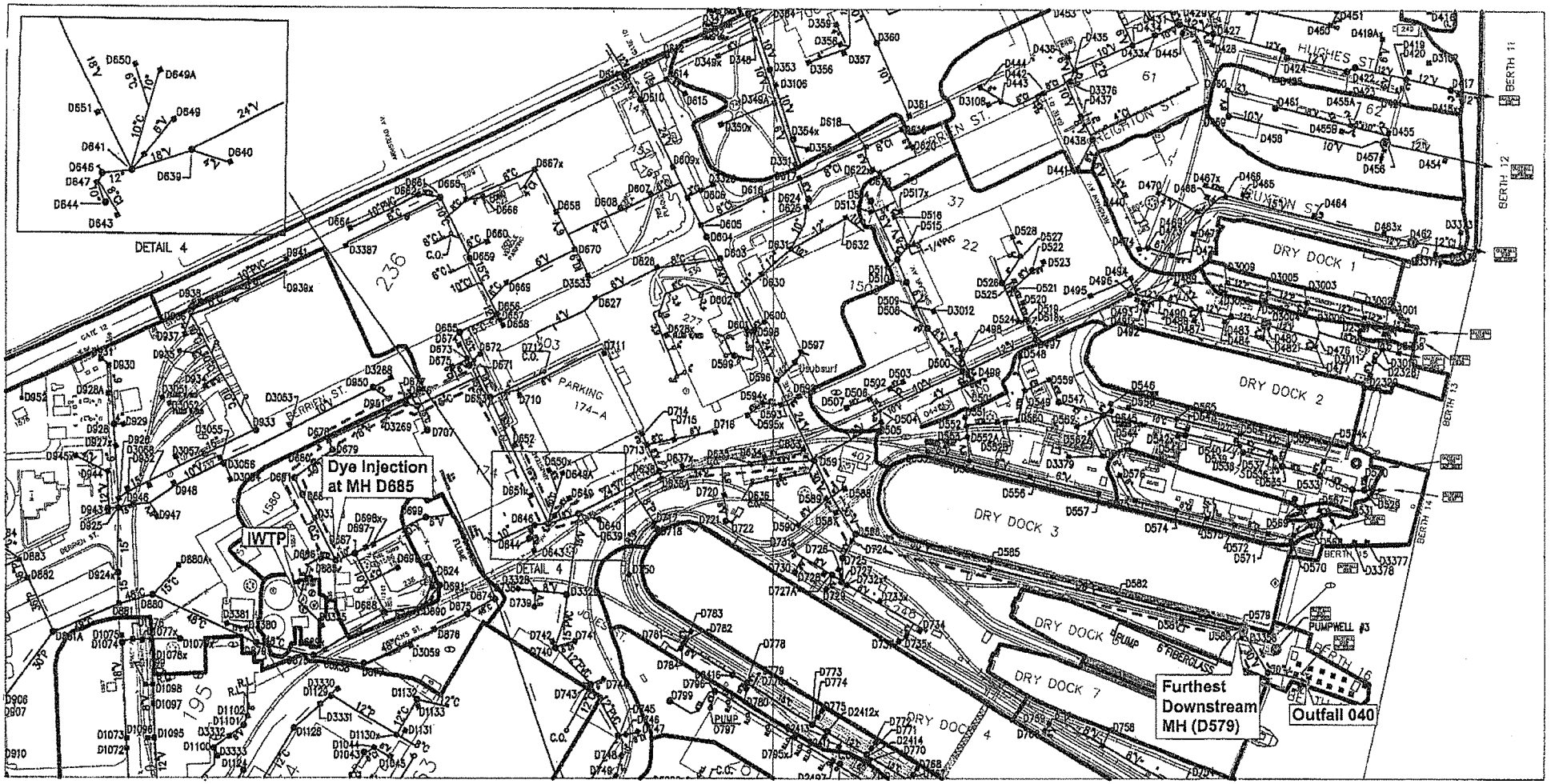
Figure 4-1
Tidal Hydrograph for the Elizabeth River at Norfolk, VA, November 16-19, 2009



Legend

- Pipe Route From Dye Injection Point to Outfall
- Storm Drain System Drainage Areas
- Storm Drain Pipes
- Storm Drain Manholes
- Drop Inlets

FIGURE 4-2
Outfall 100 Dye Study
NNSY Mixing Zone Study



Legend

- Pipe Route From Dye Injection Point to Outfall
- Storm Drain System Drainage Areas
- Storm Drain Pipes
- Storm Drain Manholes
- Drop Inlets

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FIGURE 4-3
Outfall 040 Dye Study
NNSY Mixing Zone Study

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SECTION 5

Study Results

This section presents the results of the dye tracer studies for Outfalls 100 and 040. The results of dilution calculations based on initial concentrations and receiving water measurements are presented.

5.1 Outfall 100

The amount of dilution achieved within the AIZ boundary was determined during the dye study. Transects were established in the receiving water at a distance from the discharge equal to the AIZ boundary. Dye concentrations were measured along this transect, 15 feet from the discharge to the river. Samples were also collected along transects at distances of 25 feet and 50 feet from the discharge. The measurements at 25 and 50 feet were taken for confirmation only and do not serve any regulatory purpose. Numerous sampling measurements were conducted along each transect.

All data collected during the dye study were tabulated and reduced to dilution values by comparing the concentration of dye injected to the concentration at Outfall 100 and at specific locations in the Elizabeth River. Dilution values under the critical condition (ebb tide) are presented in Table 5-1.

TABLE 5-1
Dye Study Results for Outfall 100

Sampling Location	Average Dilution Factor
Outfall 100	—[a]
Elizabeth River, 15 feet (AIZ boundary)	10:1
Elizabeth River, 25 feet	20:1
Elizabeth River, 50 feet	32:1

Note:
[a] Interference with turbidity in the near shore area prevented measurement of dye concentration at this sampling location.

The study results show that dilution of the DAF unit discharge increases substantially away from the outfall. At the AIZ boundary, 15 feet from the discharge, depth-average dilutions ranged from 7:1 to 15:1, providing an average value of 10:1. As shown in Table 5-2, the DAF unit discharge continued to dilute after the AIZ was reached, achieving an average dilution of 20:1 at a distance of 25 feet and 32:1 at 50 feet from the discharge point. The measured dilution values at the individual sampling locations are shown schematically in Figure 5-1.

It is worth noting that the field data collected at a number of sampling locations was unusable due to interference caused by high ambient turbidity. The turbid water in the near shore region around Outfall 100 was caused by various factors, particularly vessel-induced

wakes and wind-induced waves. As a result, only those data which were used in the calculation of average dilutions reported in Table 5-2 are provided in Appendix A.

5.2 Outfall 040

The amount of dilution achieved within the AIZ boundary was determined during the dye study. Transects were established in the receiving water at a distance from the discharge equal to the AIZ boundary. Dye concentrations were measured along this transect, 50 feet from the discharge to the river. Samples were also collected along transects at distances of 30 feet and 60 feet from the discharge. The measurements at 30 and 60 feet were taken for confirmation only and do not serve any regulatory purpose. Numerous sampling measurements were conducted along each transect.

All data collected during the dye study were tabulated and reduced to dilution values by comparing the concentration of dye injected to the concentration at Outfall 040 and at specific locations in the Elizabeth River. Dilution values under the critical condition (ebb tide and low slack water) are presented in Table 5-2.

TABLE 5-2
Dye Study Results for Outfall 040

Sampling Location	Average Dilution Factor
Outfall 040 (3 feet)	11:1[a]
Elizabeth River, 30 feet	13:1
Elizabeth River, 50 feet (AIZ boundary)	19:1
Elizabeth River, 60 feet	21:1

Note:
[a] A measured dilution of 11:1 at the outfall terminus indicates that the effluent had been pre-diluted in the outfall pipe during the previous flood tide period.

The study results indicate that dilution of the IWTP discharge clearly begins within the 30-inch pipe before the discharge reaches the Elizabeth River. Dilution increases substantially away from the outfall. At the AIZ boundary, 50 feet from the discharge, measured dilutions ranged from 17:1 to 21:1, providing an average value of 19:1. The IWTP discharge continued to dilute slightly after the AIZ was reached, to an average dilution of 21:1 at a distance of 60 feet from the discharge point. The measured dilution values at the individual sampling locations are shown schematically in Figure 5-2.

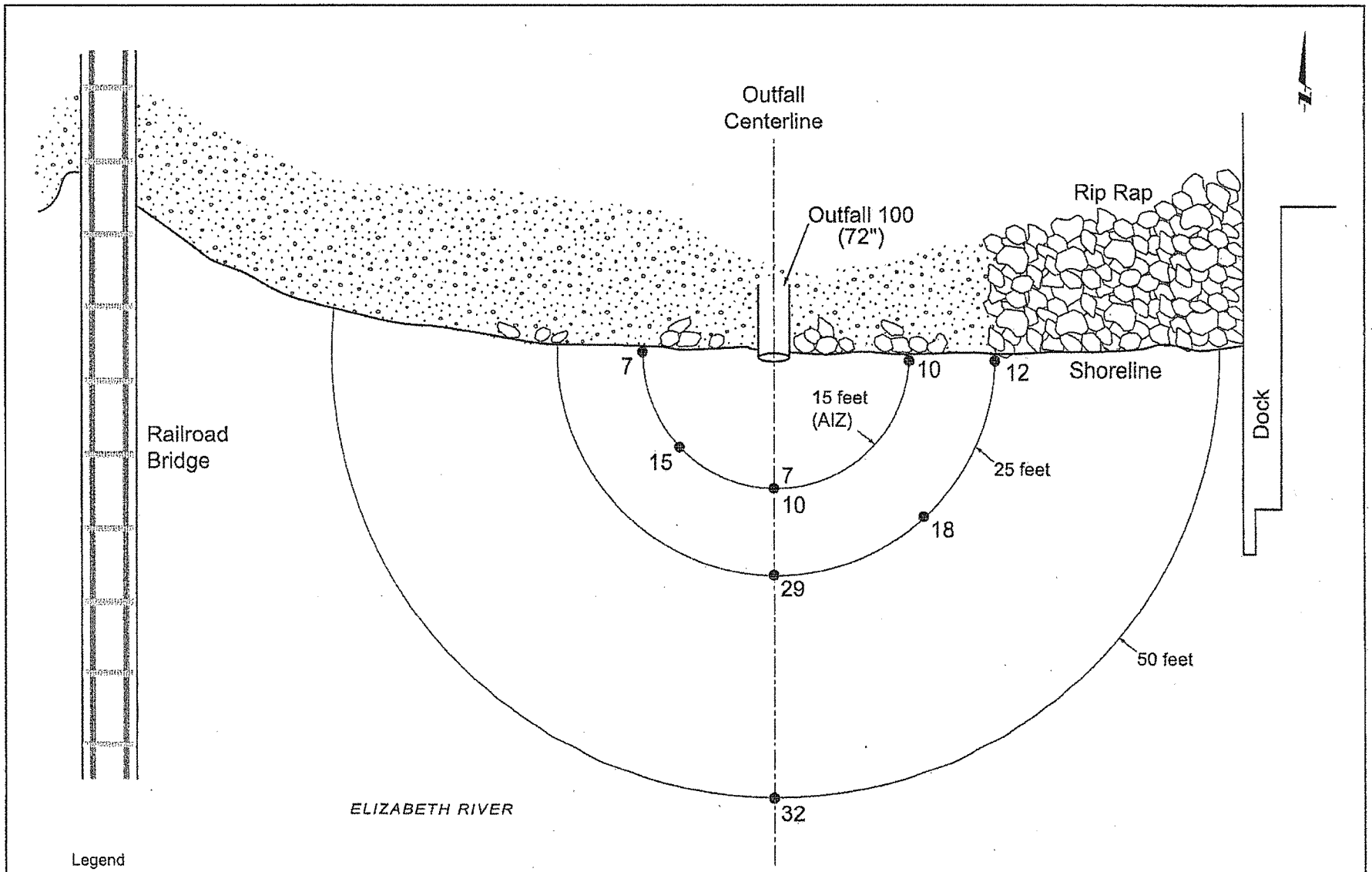

Figure 5-1

NNSY Dye Study Sampling Schematic and Measured Dilution Factors for Outfall 100

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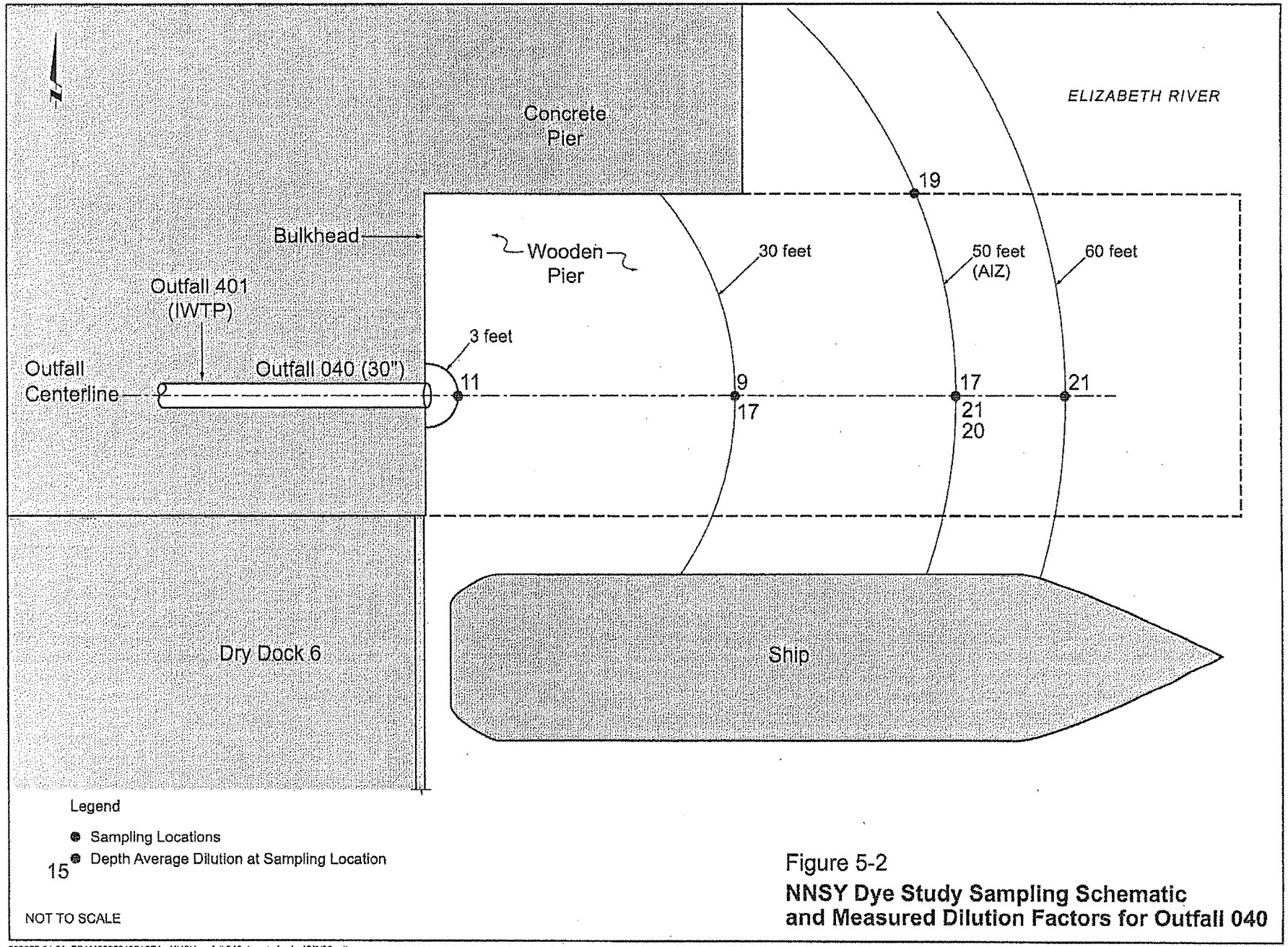

Figure 5-2

NNSY Dye Study Sampling Schematic and Measured Dilution Factors for Outfall 040

SECTION 6

Conclusions

Based on the results of the mixing zone studies, the following conclusions can be made:

- At the AIZ boundary for **Outfall 100** (15 feet from the discharge), measured dilutions ranged from 7:1 to 15:1, and averaged about 10:1.
- In comparison to the AIZ average dilution factor reported in the 1999 mixing study (13:1), the AIZ dilution factor for Outfall 100 (10:1) measured in this study is slightly lower. This may be a result of several factors, such as differing ambient conditions or tidal conditions which were encountered. Ambient conditions typical of late winter/early spring (as measured in the March 1999 dye study) are likely different than those which were measured during this study.
- As documented in the Task B Tech Memo (CH2M HILL, October 2009), an additional flow of 150 gpm has been added to the Outfall 100 discharge since the last dye study was performed. The previous mixing study concluded that an average dilution factor of 13:1 was attained at the AIZ boundary. While the discharge velocity will increase with the increase in discharge volume in the pipe, it is apparent that this increase is not sufficient to provide an increase in dilution. Therefore, the 10:1 dilution factor measured at the 15-ft AIZ boundary is most likely a result of the increase in flow.
- At the AIZ boundary for **Outfall 040** (50 feet from the discharge), measured dilutions ranged from 17:1 to 21:1, and averaged about 19:1.
- In comparison to the dilution reported in the 1996 mixing study (12:1), the measured dilution factor for Outfall 040 at the AIZ (19:1) is higher. This may be a result of several factors, such as differing ambient conditions or tidal conditions which were encountered. Ambient conditions typical of mid-summer (as measured in the July 1995 dye study) were likely different than those which were measured during this study.
- Since the last dye study on Outfall 040 was performed, the dry weather baseflow has increased, in addition to flow from Drydocks 6 and 7 and an increase in IWTP flow on an intermittent basis. These changes were documented in the Task B Tech Memo (CH2M HILL, October 2009). Since the discharge velocity will increase with discharge volume, it appears that this increase is sufficient to provide an increase in dilution (19:1). While this does not appear to be the case with Outfall 100, it is likely that the smaller pipe diameter (30-inch compared to 72-inch) has more of an effect on the discharge velocity (and hence the dilution achieved).
- The 19:1 dilution factor measured at the 50-ft AIZ boundary for Outfall 040 is most likely a result of: 1) an increase in flow creating higher discharge (exit) velocity and 2) an increase in baseflow volume causing more dilution to occur within the pipe prior to discharge.

SECTION 7

References

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Virginia Department of Environmental Quality. 2000. Guidance Memo No. 00-2011; *Guidance on Preparing VPDES Permit Limits* Memo from Larry G. Lawson to Regional Directors, dated August 24, 2000.

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Appendix A
Dye Study Measurements for Outfall 100

Appendix A is provided in a separate binder.

Appendix B
Dye Study Measurements for Outfall 040

Appendix B is provided in a separate binder.

Thomas, Carl (DEQ)

From: Doug Fritz [Doug.Fritz@dcr.virginia.gov]
Sent: Wednesday, February 10, 2010 11:40 AM
To: Thomas, Carl (DEQ)
Subject: Re: Norfolk Naval Shipyard, Portsmouth, Virginia VA0005215

Carl, I have included the language in from the November 15, 2007 Soil and Water Conservation Board where action was taken to terminate permit coverage under the MS4 permit.

The determination that continuation of MS4 permit coverage was not required was made based upon the fact that all stormwater was comingled and discharged through outfalls authorized under a Virginia Pollutant Discharge Elimination System (VPDES) permit for industrial stormwater runoff.

Virginia Soil and Water Conservation Board
Thursday, November 15, 2007
Association of Electric Cooperatives
Glen Allen, VA

Agenda Item: Termination of Need for VSMP MS4 Permit Coverage-Southeastern Public Service Authority Landfill

Recommended Board Motion:

The Virginia Soil and Water Conservation Board receives and approves staff recommendation to notify the Southeastern Public Service Authority that it is not required to retain coverage for its landfill under the VSMP General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems Registration Coverage Number VAR040102. Stormwater discharges from the facility are authorized under the Virginia Pollutant Discharge Elimination System Permit Number VA0090034.

Agenda Item: Termination of Need for VSMP MS4 Permit Coverage-Norfolk Naval Shipyard

Recommended Board Motion:

The Virginia Soil and Water Conservation Board receives and approves staff recommendation to notify the Norfolk Naval Shipyard that it is not required to retain coverage for its shipyard under the VSMP General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems Registration Coverage Number VAR040036. Stormwater discharges from the facility are authorized under the Virginia Pollutant Discharge Elimination System Permit Number VA005215.

Discussion

"The minimum measures for small MS4s were written to apply to storm sewer 'systems' providing stormwater drainage service to human populations and not individual buildings." [National Pollutant Discharge Elimination System—Regulations for Revisions of the Water Pollution Control Program Addressing Storm Water Discharges; Final Rule; Volume 64, Number 235, Page 68,749 December 8, 1999]. These facilities are industrial facilities in which the authorization to discharge stormwater has been authorized by VPDES permits issued by the Department of Environmental Quality. The duplication of permit coverage under two

NPDES programs is unnecessary.

Doug

J. Douglas Fritz, MS4 Program Manager
Department of Conservation and Recreation
203 Governor Street, Suite 206
Richmond, VA 23219
804.371.7330
804.786.1798 fax

>>> "Thomas, Carl (DEQ)" <Carl.Thomas@deq.virginia.gov> 02/10/10 11:23 AM >>>
Good Morning Mr. Fritz,

Reissuing the subject VPDES permit. Request confirmation that Naval Shipyard will not be granted coverage under your Phase II MS4 permit and the rationale for that action on the part of DCR. Information will be used as minor discussion point in permit fact sheet to set stage for mainly industrial approach for SW management, etc.

Thanks Much

carl.thomas@deq.virginia.gov

757.518.2161

ATTACHMENT 14

PUBLIC PARTICIPATION